NON-CONSUMPTIVE USES OF THE MICHIGAN DEER HERD

Dissertation for the Degree of Ph. D.
MICHIGAN STATE UNIVERSITY
EDWARD E. LANGENAU, JR.
1976

This is to certify that the

thesis entitled

Non-Consumptive Uses
of the Michigan Deer Herd

presented by

Edward E. Langenau, Jr.

has been accepted towards fulfillment
of the requirements for

Doctor of Philosophy degree in Fisheries and Wildlife

George A Petrides

Major professor

Date May 3, 1976

O-7639

ABSTRACT

NON-CONSUMPTIVE USES OF THE
MICHIGAN DEER HERD

By

Edward E. Langenau, Jr.

A current management objective of the Michigan Wildlife Division is to increase the state's deer herd to 1,000,000 animals by the autumn of 1980. Once this objective is attained the emphasis will probably shift from increasing numbers of deer to reducing costs and to increasing public benefits from a stable herd. This study was undertaken to survey existing public attitudes and behavior patterns related to non-consumptive uses of deer so that future management programs might optimize both hunting and non-hunting public benefits.

Michigan is divided by the Michigan Department of Natural Resources into three management regions for the administration of natural resource programs. For this investigation, a sample of 1,200 people who filed 1974 individual income taxes in the state was selected in each of the three regions. A questionnaire was mailed to each of the 3,600 people who were sampled. Two reminders were

sent to non-respondents. A total of 2,409 completed questionnaires were finally returned (70% of those delivered).

Two consumptive and four non-consumptive categories of public use of deer were identified. Consumptive uses were defined as those human activities which permanently removed an individual deer from its habitat. Type I deer use was described as intentional harvest by hunting and Type II deer use as mortality due to human activities other than hunting. Non-consumptive uses were defined as those which involved direct or indirect contact with the deer resource but which did not result in permanent removal of individuals from the habitat. Type III deer use was stated to be the active field pursuit of deer with the intent to kill but without a resultant harvest of the animal, Type IV included the intentional field search for deer solely to observe or photograph them, Type V was the sighting of deer incidentally while participating in outdoor recreation which was not directed toward search for deer, and Type VI use was the symbolic or conceptual enjoyment of deer including vicarious activities such as reading about deer. This study concentrated on Types IV, V, and VI non-consumptive uses of deer.

About 2.6 million people in Michigan were estimated to have participated in Type IV uses (hiking or driving to look for deer and attempting to photograph deer) during

the preceding year. Approximately 0.6 million of these individuals had also hunted deer during the 1974 hunting season. Respondents living in Region I and II who had engaged in this type of non-consumptive use were, on the average, more rural and had less education than people in these regions who did not participate. In Region III, no differences were found between participants and non-participants with regard to education or residence. In all regions, participants were less opposed to hunting, even if they themselves did not hunt, than were people who did not pursue deer for viewing. Type IV deer-users who did not hunt deer selected the same conditions for viewing as did deer hunters; autumn sightings, bucks more than does or fawns, and forest habitats were preferred.

Most respondents (89%) said that seeing deer added, or would add, to the enjoyment of their favorite outdoor recreation. Incidental deer sightings of Type V, may be significant in adding to the quality of many non-hunting recreations. The quality of camping and hiking was influenced most by deer-sightings while the quality of boating, canoeing, skiing and swimming was influenced less.

Slightly more than 6 million people in the state were estimated to have participated in Type VI conceptual and symbolic uses of deer during the previous year. About 31 percent of all respondents had not been involved in

deer-related activities of any kind during the year. Approximately 41 percent of these non-users were opposed to hunting, as compared with 27 percent of other respondents.

Several management aspects of non-consumptive uses were discussed. It was recommended that the role of education in wildlife management be expanded. Educational research might first be initiated to explore the relationship between public attitudes and knowledge about wildlife. The establishment of experimental wildlife education centers and management demonstration areas was suggested. A question was also raised as to the feasibility of increasing the visibility of deer by managing the behavior of deer and recreationists.

An appeal was made for the development of a philosophy of wildlife management which extends beyond human benefit.

NON-CONSUMPTIVE USES OF THE MICHIGAN DEER HERD

By

Edward E. Langenau, Jr.

A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Department of Fisheries and Wildlife

1976

ACKNOWLEDGMENTS

This study was supported by funds from the Wildlife Management Institute, National Rifle Association of America, American Forest Institute, and the American Petroleum Institute.

I thank Dr. George A. Petrides, chairman of my guidance committee, for encouraging me to assume a broad, inter-disciplinary approach in my graduate education. The late Dr. Stanley C. Ratner, Department of Psychology, helped me explore the literature and concepts in a minor field: animal behavior. I appreciated the concern that Dr. Ratner had for education and students. His kind, yet analytical nature inspired many of those who had known him. Dr. John H. Fitch, Biological Science Program, was of great assistance in further developing my concepts in animal behavior. He was also very helpful in clarifying some of the concepts in this research concerning public education and governmental ethics. Dr. Ralph M. Levine, Department of Psychology, has been an integral part of University and State research dealing with people and wildlife. It has been an honor to have known and worked with a man of his vision and clarity of thinking. Dr.

Duane E. Ullrey, Department of Animal Husbandry, has served as a model of an active and prolific research scientist. In many ways, he has been instrumental, over the years, in changing the wildlife professional from hunter to scientist.

I am deeply indebted to many of my colleagues and supervisors in the Wildlife Division of the Michigan Department of Natural Resources. Mr. Merrill (Pete) Petoskey, former chief of the Wildlife Division, developed the kind of management philosophy which required people-wildlife research. Mr. Carl Bennett and Mr. Keith Heezen, wildlife research administrators, have been largely responsible for generating the research climate to produce management-oriented studies. I am especially indebted to Carl for helping me to develop an active research team within the DNR, for his personal guidance through the mysteries of data and politics, and for his capacity as both a creative thinker and administrative wizard. Gale Jamsen, biometrician, has been both friend and colleague and helped with the data analysis. None of this work would have been completed without his advice and support. Dr. John Stuht, Mr. John Lerg and Dr. Glenn Belyea have spent much time discussing public aspects of wildlife management. Many of the ideas in this study were products of these discussions. The Michigan Department of Treasury was helpful in selecting the random sample and the

assistance of Mrs. Dawn Moore, systems analyst, was appreciated.

My parents have supplied considerable encouragement throughout my graduate education. I also thank my wife, Diana, for her sacrifices, support, and love. I thank my two sons, Erik and David, for giving up many weekends and evenings. I hope that the collective work of wildlife professionals will allow their generation the maturity to realize the pleasure and meaning of wildlife, be it by hunting or by other ways of knowing nature's secrets. Above all else, may their generation learn to organize human society in keeping with natural laws and biological principles.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

*See pocket inside the back cover

INTRODUCTION

The Wildlife Division of the Michigan Department of Natural Resources established a management objective to have 1,000,000 white-tailed deer (Odocoileus virginianus) in the state by the autumn of 1980 (Petoskey 1971). In order to meet this objective, a deer habitat improvement program was begun (Byelich et al., 1972; Byelich 1973) and was financed by adding $2.50 to the cost of each deer hunting license. The legislature earmarked $1.50 of this increase for the Deer Range Improvement Program. Approximately $600,000 to $1,000,000 a year has since been made available for timber cutting, management of forest openings, and for other silvicultural treatments designed to improve the Michigan deer range.

Research, as well as management, became geared to the objective of developing a state herd of 1,000,000 deer. An extensive habitat research project was organized (Bennett 1972) to determine the most efficient way to manage deer. This deer range research included studies on the vegetational (Cook 1975), deer (Moran 1975) and people (Langenau 1975) responses to clearcutting. Research was also initiated on deer physiology, nutrition and

reproduction (Duvendeck 1975; Verme 1975), and on deer behavior (Ozoga 1975). All of these studies were designed to provide information relevant to the management objective of attaining a state herd of 1,000,000 deer.

Once this objective is reached, management policy will probably emphasize maintaining a stable herd of this size rather than attempting to further increase the population. Wildlife administrators might then concentrate on reducing the economic and social costs of the deer herd while also increasing public benefits (Figure 1).

Some of these increased benefits would derive from increasing the quality of hunting. Other public benefits would arise from increasing the opportunity for non-consumptive uses of deer. The management of deer for public benefits, in addition to recreational hunting, will require basic information on public attitudes, demands and behaviors. The purpose of this study was to provide that basic information.

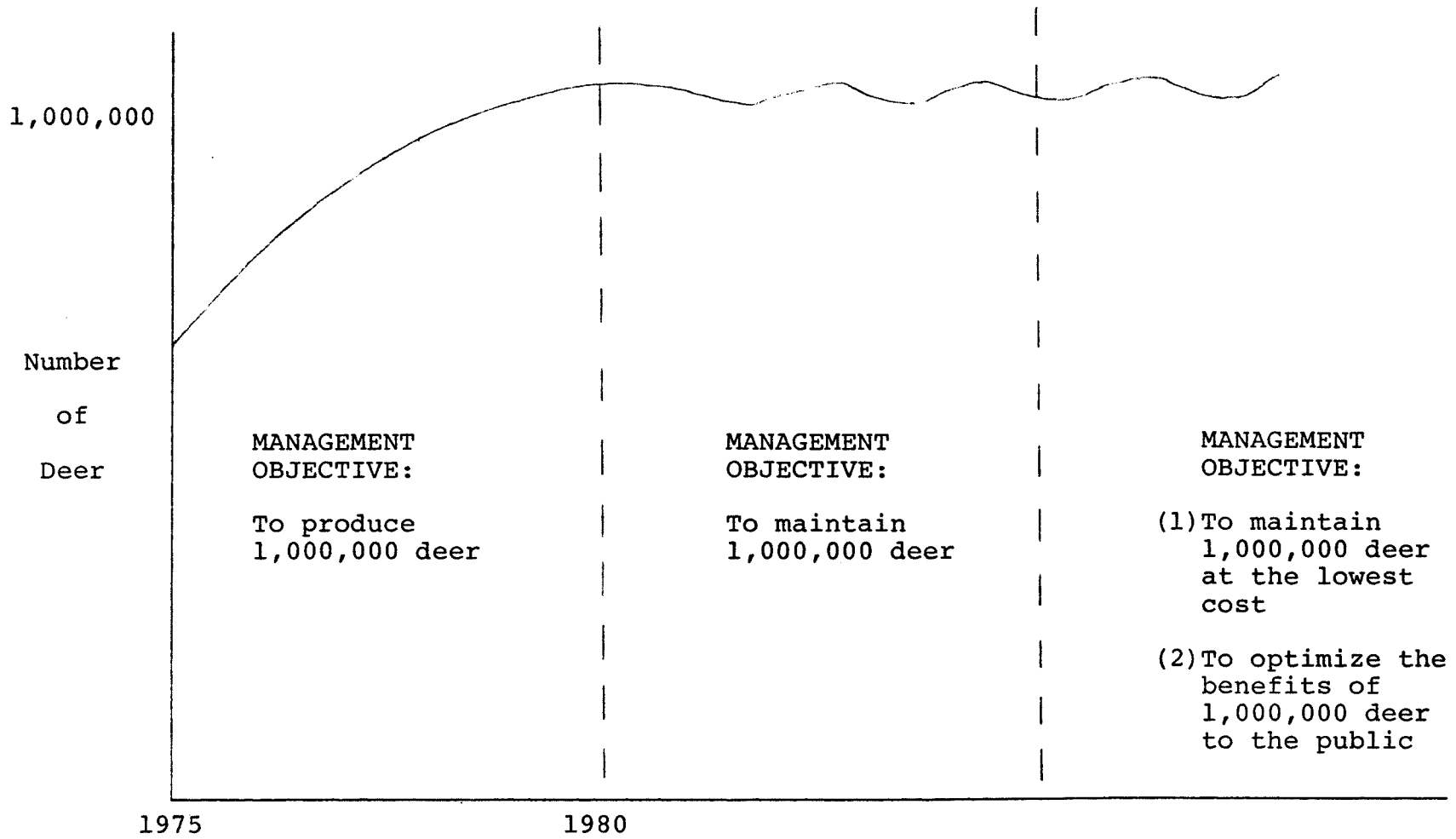

Fig. 1.--Possible trends in Michigan deer management.

DEFINITIONS

Many investigators studying the public uses of wildlife have used terms which have not been thoroughly defined. For example, the terms "consumptive use" of wildlife and "hunting" have been used interchangeably. However, hunters who are not successful in taking game are not consumers of the game resource. The term "appreciative use" (Hendee 1969) has been used to describe non-hunting uses of wildlife such as viewing, photographing and searching for wildlife. Yet, this might imply that hunters are not appreciative of wildlife resource values.

Consumptive Uses of Wildlife

Consumptive use denotes a human activity which physically removes a living organism from its habitat. One kind of removal could be in the form of reducing the organism to human possession as in taking a deer by legal or illegal shooting. Removal may also be in the form of killing an animal and leaving it dead. Consumptive use also includes habitat-destructive activities of man, such as development of land for residential living which

either kills an animal or causes it to move to another area.

Non-Consumptive Uses of Wildlife

Non-consumptive use denotes a human activity which pertains to wildlife but does not remove an organism from its habitat. In order for non-consumptive use to occur, people must encounter wildlife, search for wildlife, or symbolically relate to wildlife (e.g., read a book about wildlife).

Categories of Consumptive and Non-Consumptive Uses of Wildlife

Several types of public use are included within each general category (Figure 2). Consumptive uses have been divided into two types. Type I wildlife use is defined as the intentional and permanent removal of an organism from its habitat. This might be accomplished by trapping, snaring, poisoning or recreational hunting. Methods may be legal or illegal. Type II wildlife use denotes the unintentional and yet permanent removal of an organism from its habitat. Examples might include vehicle-wildlife collisions or accidental poisonings.

Non-consumptive uses of wildlife were divided into four categories. Type III wildlife use is intentional pursuit to remove an organism from its habitat without success in removal. This would include recreational

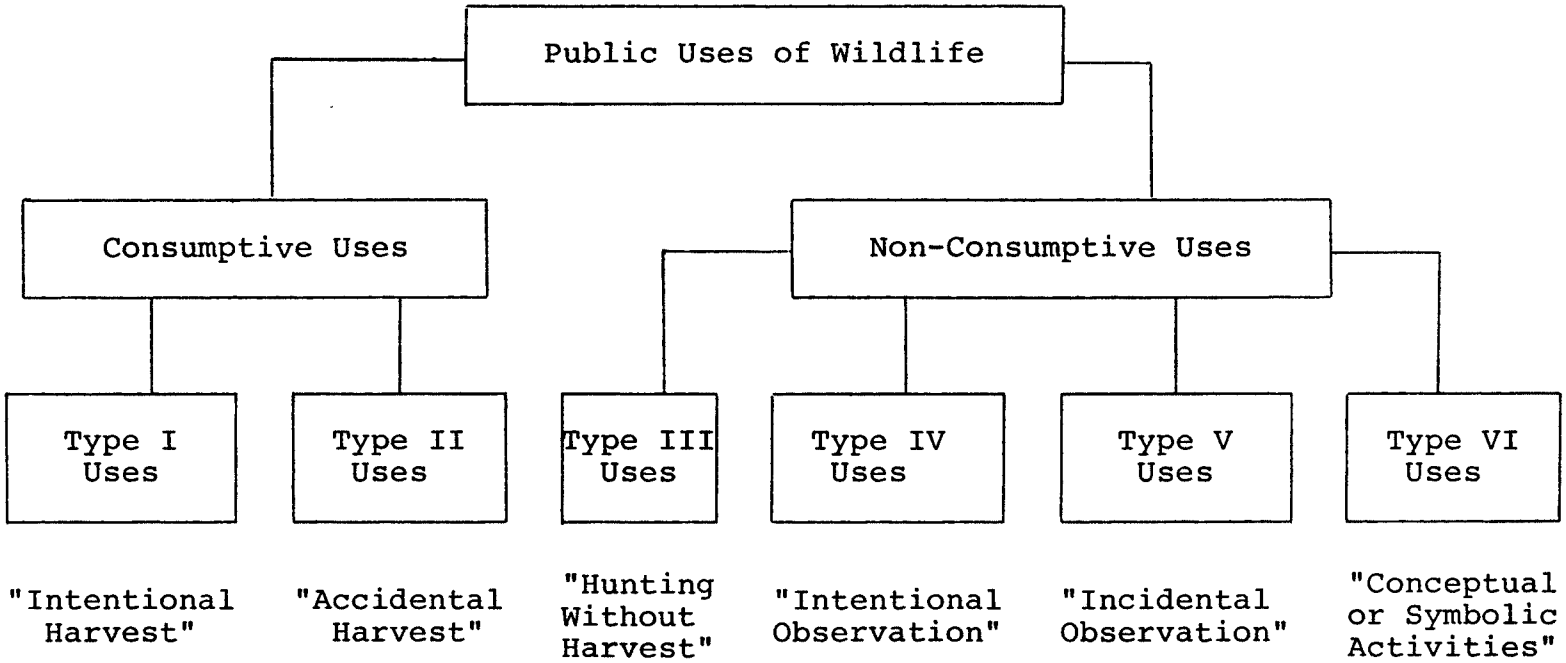

Fig. 2.--Categories of public uses of wildlife.

hunting which does not result in actual harvest. Type IV use denotes the active pursuit of wildlife in or near its habitat in order to view, observe, study, or photograph the organism. The observation of wildlife, when incidental to other activities, is defined as Type V wildlife use. A person seeing wildlife while camping and not actively looking for wildlife would be an example. The last form of public use, Type VI, denotes the symbolic or conceptual appreciation of wildlife when people are not necessarily in or near the organism's habitat. Examples include reading books about wildlife, watching television shows about wildlife and looking at wildlife art.

METHODS

Michigan is divided by the Department of Natural Resources into three regions for the administration of natural resource programs (Figure 3). These three regions are ecologically and sociologically (Moncrief 1970) different. About 3.4 percent of the Michigan public lives in Region I, 7.7 percent in Region II and 88.9 percent in Region III. A total of 3,600 people were selected for a mail survey; 1,200 in Region I, 1,200 in Region II and 1,200 in Region III. Statewide means were determined by applying weighting factors of 0.034, 0.077 and 0.889 for the three regions.

The number of people living in each county was determined from the 1970 census. County sample sizes were then computed on the basis of county:region population ratios. A Postal Zip Code Directory (Michigan Bureau of Management and Budget 1974) was used to determine the number of mailing addresses which occurred within every zip code in each county. It was assumed that the population density was proportional to the number of mailing addresses. The ratio of addresses for each zip code to the total in each county was then used to calculate the

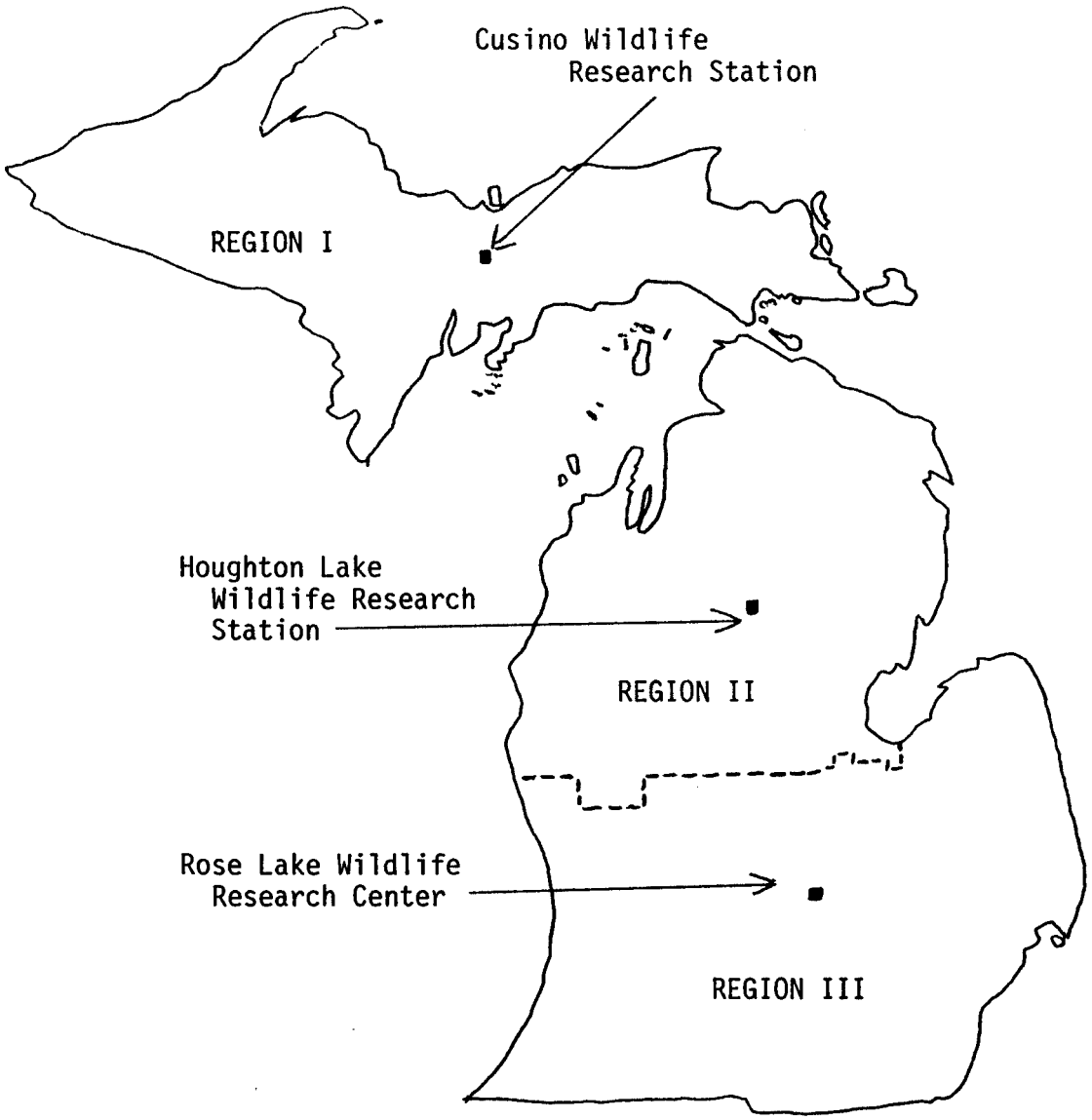

Fig. 3.--Map showing the location of Regions I, II and III in Michigan.

number of people to be selected from each of the zip codes throughout the state. Zip codes with very small populations (less than one person to be sampled) were lumped into one block within each county. The number of people needed from this block was then randomly selected. This procedure was used to insure selection of some people in very small towns. Multiple zip codes in large cities were sampled in proportion to number of mailing addresses.

Names and addresses were obtained from a complete file of 3.3 million Michigan individual income tax returns filed in 1974. Joint income tax returns included the names of both husband and wife. The husband's name was chosen in half of the cases and the wife's name in half of the cases.

A self-administered questionnaire (Appendix I, II, III) was designed to measure several aspects of non-consumptive use of deer. The questionnaire was pre-tested by mailing it to fifteen people in each of the three regions. Several items contained some ambiguity, did not generate sufficient variance in response, or got low response rates and were changed. The questionnaire was revised again and pre-tested a second time.

Questionnaires were sent in a series of three mailings (one original and two reminders), one month apart, between February 24 and April 24, 1975. A pre-addressed and stamped envelope was included. People in

Region I were asked to return completed questionnaires to the Cusino Wildlife Research Station, and people in Regions II and III to Houghton Lake Wildlife Research Station and Rose Lake Wildlife Research Center, respectively (Figure 3).

Returned questionnaires were coded on 80-column data sheets and responses were keypunched on computer cards. An edit program was then used to check for errors in coding and keypunching. The Statistical Package for the Social Sciences (SPSS) was employed to compile and analyze data.

Most hypotheses were tested with the chi-square statistic. The null hypothesis was rejected in situations where the probability of a Type I error was less than 0.05. In presenting the test results, the level of significance was indicated as $< .05$ or $\geq .05$. If a hypothesis was rejected at the 0.001 level of significance, it was still noted as $< .05$. The raw chi-square values and degrees of freedom were included for readers who use significance values other than 0.05.

Regional similarities were tested by first reducing the cell sizes for Region I and Region II to those which would have occurred without stratification. Although there are methods to adjust variances of parametric data from different strata, no such method exists for nominal or ordinal data. To use the chi-square statistic without

reducing cell sizes violates several critical assumptions. Cell sizes were not reduced when hypotheses were tested within a stratum or region.

RESULTS

A total of 2,409 questionnaires, 70 percent of those delivered, were returned. The response rate was highest in Region II, followed by Regions I and III (Table 1).

In an attempt to determine the direction of non-response bias on a few key variables, ten non-respondents in Region I, ten in Region II, and twenty in Region III were interviewed by telephone. Only one of the non-respondents had hunted deer and only six said they had participated in deer-related activities. These participation rates are lower than those reported by people who returned questionnaires. The 40 non-respondents also reported lower levels of deer appreciation and saw fewer deer in Michigan during the past year than did respondents. Four of the non-respondents suggested that the survey was a waste of money and two of these four indicated that there were things of greater importance for the University to study. Two of the 40 non-respondents said they were illiterate and one older woman said that the questionnaire print was so small that she could not read some of the items. It is apparent that some non-response bias existed.

Table 1.--Questionnaire response rates by region of residence within Michigan.

Region	No. of People in Sample	Non-Deliverable Questionnaires	No. of Questionnaires Returned	Response Rate
I	1,200	36	826	71%
II	1,200	45	886	77%
III	1,200	73	697	62%
Totals	3,600	154	2,409	70%

Characteristics of Respondents

The mean age of people responding to the questionnaire was 44 years and 54 percent of the respondents were male. Marital status was reported to be 14 percent single, 75 percent married, 6 percent divorced, and 5 percent widowed. Approximately half of the respondents in each region said they had children under 21 living at home with them. Other demographic characteristics of respondents are summarized in Table 2.

General Attitudes Towards Deer

People in all regions said they would get considerable enjoyment from seeing deer in the wild. When asked to rate this enjoyment, the modal response in each of the three regions was "very high." Weighted means for the state were 55 percent very high, 31 percent high, 12 percent medium, 1 percent low and 1 percent very low enjoyment levels. Enjoyment levels were higher for deer hunters than for people who did not hunt deer ($\chi_1^2 = 30.48$, df = 4, $p < .05$; $\chi_2^2 = 14.71$, df = 4, $p < .05$; $\chi_3^2 = 14.00$, df = 4, $p < .05$: where χ_1^2 is the chi-square value for testing the hypothesis in Region I, χ_2^2 in Region II and χ_3^2 in Region III). Among the group of people who did not hunt deer, respondents living in Region I reported more enjoyment from seeing deer than those non-hunters living in Regions II and III ($\chi^2 = 9.71$, df = 4, $p < .05$). Deer hunters expressed high enjoyment

Table 2.--Education, occupation, and residence of taxpayers responding to a mail questionnaire.

Parameter	Region I	Region II	Region III
Education Completed			
Grade School	6%	7%	8%
High School	39%	33%	33%
Some College	24%	25%	27%
College Degree	16%	19%	15%
Graduate Degree	15%	16%	17%
Occupation			
Homemaker	23%	21%	18%
Technical/Professional	13%	15%	17%
Unskilled Labor	10%	9%	15%
Managerial	9%	11%	11%
Skilled Labor	9%	7%	9%
Secretarial/Clerical	8%	6%	9%
Educational	8%	9%	7%
Retired	10%	11%	5%
All Others	10%	11%	9%
Perception of Current Residence			
Major City	0%	0%	18%
Medium City	1%	2%	12%
Suburb	1%	2%	24%
Small City	14%	26%	18%
Village/Town	60%	42%	15%
Rural	24%	28%	13%
Perception of Childhood Residence			
Major City	13%	17%	11%
Medium City	8%	10%	8%
Suburb	6%	8%	7%
Small City	15%	16%	19%
Village/Town	36%	29%	32%
Rural	20%	20%	23%
Multiple of Above	2%	0%	0%

in seeing deer which was independent of region of residence ($\chi^2 = 1.62$, df = 4, $p \geq .05$).

About 85 percent of the Region I, 76 percent of the Region II and 76 percent of the Region III respondents agreed or strongly agreed with the statement that "we should have more deer in Michigan." Regional differences were not statistically significant ($\chi^2 = 2.27$, df = 6, $p \geq .05$). Respondents who did not hunt deer were more likely to disagree with this statement (Table 3) than deer hunters ($\chi_1^2 = 23.31$, df = 3, $p < .05$; $\chi_2^2 = 39.85$, df = 3, $p < .05$; $\chi_3^2 = 25.11$, df = 3, $p < .05$).

Relatively few people felt that "there are too many other problems, such as inflation, to worry about deer." Only four percent of the respondents strongly agreed and 9 percent agreed with this statement, while 51 percent disagreed and 34 percent strongly disagreed. Although this survey was completed during a period of high unemployment and high inflation, people still felt that deer management was an important issue.

Sighting Preferences

The conditions under which people wanted to see wild deer were investigated. When preferences were stated (Table 4), they were most often toward moderate numbers of deer, bucks, autumn sightings and forest habitats.

Table 3.--Questionnaire responses to the statement, "We should have more deer in Michigan."

Responses	Region I		Region II		Region III		Weighted Means for Michigan
	Deer Hunters (N=231)	All Others (N=593)	Deer Hunters (N=190)	All Others (N=690)	Deer Hunters (N=81)	All Others (N=610)	
Strongly Agree	46%	32%	40%	19%	39%	18%	21%
Agree	47%	50%	46%	55%	51%	57%	56%
Disagree	7%	15%	12%	24%	10%	22%	21%
Strongly Disagree	0%	3%	2%	2%	0%	3%	2%
TOTALS	100%	100%	100%	100%	100%	100%	100%

Table 4.--Preferences for conditions under which questionnaire respondents said they wanted to view wild deer.

Condition and Response	Region I		Region II		Region III		Weighted Means for Michigan
	Deer Hunters (N=231)	All Others (N=593)	Deer Hunters (N=190)	All Others (N=690)	Deer Hunters (N=81)	All Others (N=610)	
Numbers							
1 deer	5%	4%	4%	4%	4%	4%	4%
10 deer	40%	40%	40%	44%	48%	47%	47%
100 deer	13%	7%	13%	6%	12%	7%	8%
No Preference	42%	49%	43%	46%	36%	42%	41%
Sex-Age Class							
Buck	38%	15%	37%	13%	61%	14%	20%
Doe	4%	3%	1%	3%	1%	3%	3%
Fawn	6%	14%	5%	15%	6%	16%	15%
No Preference	52%	68%	57%	69%	32%	67%	62%
Social Group							
Buck Group	18%	4%	19%	3%	35%	6%	9%
Family Group	41%	48%	39%	50%	39%	45%	44%
No Preference	41%	48%	42%	47%	26%	49%	47%

Table 4.--Continued.

Condition and Response	Region I		Region II		Region III		Weighted Means for Michigan
	Deer Hunters (N=231)	All Others (N=593)	Deer Hunters (N=190)	All Others (N=690)	Deer Hunters (N=81)	All Others (N=610)	
Season							
Winter	5%	4%	9%	5%	19%	4%	6%
Spring	5%	10%	6%	6%	0%	7%	6%
Summer	4%	11%	1%	5%	3%	9%	8%
Autumn	42%	15%	36%	19%	47%	21%	24%
No Preference	44%	60%	48%	65%	31%	59%	56%
Habitat							
Field	15%	19%	22%	26%	16%	24%	23%
Forest	53%	35%	50%	33%	52%	33%	35%
Lake Shore	1%	5%	2%	4%	3%	6%	5%
Highway	1%	2%	0%	1%	0%	0%	1%
No Preference	30%	39%	26%	36%	29%	37%	36%

Sighting preferences of deer hunters were compared with those of people who did not hunt deer (Table 4). A large number of people in both groups showed no preferences, implying that seeing deer, under any condition, was enjoyable. Where preferences were shown, both groups selected moderate numbers of deer, autumn sightings and forest habitats. Deer hunters were more likely to prefer seeing bucks while other respondents were about equally divided in wanting to see bucks and fawns ($\chi^2 = 50.97$, $df = 2$, $p < .05$). Deer hunters were also more interested in seeing buck groups than were other people ($\chi^2 = 74.88$, $df = 1$, $p < .05$).

Preferences for Seeing Other Wildlife Species, Compared to Deer

The enjoyment that people got, or thought they would get, from seeing other species besides deer was rated on a five point Lickert scale (Babbie 1973) from much-more to much-less enjoyable than seeing deer. Respondents listed eagle as highest and coyote as lowest in viewing enjoyment (Table 5).

Respondents' Experience with Michigan Deer

Several questions were designed to measure how much experience people have had with deer and deer signs.

Table 5.--The subjective rating of how much enjoyment questionnaire respondents in Michigan got, or thought they would get, from seeing wildlife as compared with the enjoyment derived from seeing deer.

Enjoyment Rating	Percentage Response for Each Species						
	Coyote	Moose	Bear	Eagle	Bobcat	Blue Jay	Elk
Much more than deer	2%	11%	7%	15%	6%	3%	11%
More than deer	4%	19%	11%	20%	7%	4%	19%
Same as deer	29%	52%	48%	41%	35%	35%	59%
Less than deer	31%	12%	21%	15%	28%	26%	8%
Much less than deer	34%	6%	13%	9%	24%	32%	3%
TOTALS	100%	100%	100%	100%	100%	100%	100%

Sightings

Two percent of the respondents in Region I, 2 percent in Region II and 17 percent in Region III stated that they had never seen a wild deer in Michigan. Similarly, 11 percent of respondents in Region I, 12 percent in Region II and 31 percent in Region III had seen wild deer in Michigan, but not during the past 12 months.

Deer Sign

People were asked if they had ever seen tracks, trails, beds, yards, or droppings of deer in Michigan. As expected, deer hunters had more experience than non-deer hunters. Region III respondents had least experience with deer sign (Table 6).

Deer Damage

A surprising number of people (9% in Region I, 14% in Region II and 4% in Region III) had experienced some kind of property damage by deer in Michigan. Damage ranged from deer eating garden vegetables to a deer jumping through a motel window. The majority of damage reported was due to auto or truck collisions with deer (48%), followed by garden losses (19%) and crop damage (19%). One respondent indicated that a family member had been killed in a car-deer collision.

Table 6.--Percentages of questionnaire respondents who reported having seen signs of deer in Michigan.

Item	Region I		Region II		Region III		Weighted Means for Michigan
	Deer Hunters	All Others	Deer Hunters	All Others	Deer Hunters	All Others	
Deer Tracks	99%	86%	100%	86%	98%	61%	68%
Deer Trails	97%	77%	99%	77%	96%	51%	59%
Deer Beds	94%	49%	94%	49%	90%	28%	56%
Deer Yards	78%	50%	73%	37%	63%	21%	29%
Deer Droppings	98%	68%	96%	67%	94%	43%	55%

Deer Hunting

Forty-nine percent of the respondents in Region I, 45 percent in Region II, and 37 percent in Region III indicated that they had hunted deer at some time. Approximately 28 percent, 22 percent, and 12 percent in Regions I, II, and III, respectively, responded they had hunted deer in Michigan within the past 12 months.

Non-Consumptive Uses of Deer

A taxonomy of public uses of wildlife was previously discussed. Four types of non-consumptive uses can be distinguished in relation to deer:

Type III - Hunting which does not result in harvest

Type IV - Non-hunting search to observe or photograph deer

Type V - Incidental sightings of deer or deer signs

Type VI - Conceptual or symbolic activities related to deer

Type III Uses of Michigan Deer

This type of public use was not investigated.

Type IV Uses of Michigan Deer

People were asked if they had intentionally driven or hiked to search for wild deer and if they had attempted to photograph wild deer during the previous year. Percentage participation rates were then calculated (Table 7). Driving to look for deer was the most common

Table 7.--Percentages of questionnaire respondents who engaged in Type IV non-consumptive deer-related activities at least once during the previous year.

Activity	Region I (N=826)	Region II (N=886)	Region III (N=697)	Weighted Means for Michigan
Driving to look for deer	52%	48%	29%	31%
Hiking to look for deer	33%	27%	18%	19%
Trying to and/or photographing deer	19%	12%	11%	12%

Type IV use, followed by hiking to search for deer. Attempting to photograph wild deer was the least frequent activity.

Respondents also indicated the number of times that they had actually participated in each of these three activities during the year. The frequency of participation was determined only for those people who indicated that they had participated at least once during the year (Table 8). Statewide, the weighted means were 11.3 times for driving to look for deer, 17.6 times a year for hiking to look for deer, and 3.9 times a year for attempting to photograph deer.

A "Type IV deer user" was operationally defined as a respondent who engaged in any one of the three activities at least once during the previous year. According to this definition, these people comprised 65 percent of the respondents in Region I, 60 percent of those in Region II and 39 percent of those in Region III. Region III respondents were less likely to be classified in this group than Region I and II respondents ($\chi^2 = 18.96$, $df = 1$, $p < .05$).

Approximately 25 percent of these Type IV users indicated that they had also hunted deer during the past year. Therefore, there were an estimated three taxpayers who watched or photographed deer for every one who hunted deer. Because there were 657,500 deer hunters in Michigan

Table 8.--Mean number of times that participants engaged in Type IV non-consumptive deer-related activities during the previous year.

Activity	Region I (N=826)	Region II (N=886)	Region III (N=697)	Weighted Means for Michigan
Driving to look for deer	10.6	13.3	11.1	11.3
Hiking to look for deer	12.7	10.3	18.5	17.6
Trying to and/or photographing deer	6.5	4.2	3.8	3.9

during 1974 (Hawn 1975), an estimated 2.6 million people probably engaged in Type IV deer use during the preceding year. An estimated 2.0 million of these individuals did not hunt deer during the previous year.

People were asked if they had hunted in the previous 12 months and if they approved or disapproved of hunting. "Hunters" were classified as those people who answered "yes" to the question, "Did you hunt in Michigan during the past 12 months?" "Non-hunters" were identified as those people who answered "no" to the above question but who were not opposed to hunting. "Anti-hunters" were defined as those respondents who had not hunted and were opposed to hunting. Respondents from each region were then assigned to one of these three groups (Table 9).

The proportion of people engaging in Type IV (intentional observation) deer use within each of these three groups was calculated (Table 10). Hunters were most often involved in this kind of non-consumptive use of deer, followed by non-hunters and then anti-hunters. Differences in all regions were statistically significant ($\chi_1^2 = 66.98$, df = 2, $p < .05$; $\chi_2^2 = 64.35$, df = 2, $p < .05$; $\chi_3^2 = 88.73$, df = 2, $p < .05$). It is beyond the scope of this study to discuss anti-hunting sentiment as a distinct topic, but some differences in hunter's, non-hunter's, and anti-hunter's attitudes, characteristics, and behaviors were tabulated (Appendices IV-VII).

Table 9.--Percentages of questionnaire respondents in each of the three Michigan regions who were classified as hunters, non-hunters, and anti-hunters.

Group	Region I (N=823)	Region II (N=879)	Region III (N=692)	Weighted Means for Michigan
Hunters	33%	25%	15%	17%
Non-Hunters	47%	52%	53%	52%
Anti-Hunters	20%	23%	32%	31%
TOTALS	100%	100%	100%	100%

Table 10.--Percentages of hunters, non-hunters and anti-hunters who participated in Type IV non-consumptive uses of Michigan deer.

Group	Region I (N=826)	Region II (N=886)	Region III (N=697)	Weighted Means for Michigan
Hunters	78%	81%	72%	73%
Non-Hunters	61%	61%	56%	57%
Anti-Hunters	59%	43%	20%	23%

The characteristics of people who drove to look for deer, hiked to look for deer or tried to photograph deer were compared with the characteristics of people who did not engage in any of these activities (Table 11). No differences were found between the groups in marital status or in the percentages of respondents with children in the home. The majority of respondents who participated in Type IV deer use were male as compared with respondents who were not involved in these activities ($\chi_1^2 = 6.22$, df = 1, $p < .05$; $\chi_2^2 = 6.69$, df = 1, $p < .05$; $\chi_3^2 = 14.36$, df = 1, $p < .05$). Type IV deer users in Region I, on the average, had less education ($\chi_1^2 = 10.96$, df = 4, $p < .05$) than Region I people who never drove to look for deer, hiked to look for deer or tried to photograph deer. There was no difference between rural or urban residents ($\chi_1^2 = 10.36$, df = 5, $p \geq .05$). Among Region II respondents, Type IV deer users had less education ($\chi_2^2 = 24.85$, df = 4, $p < .05$) and more rural residences ($\chi_2^2 = 24.06$, df = 5, $p < .05$) than people not participating in Type IV uses of deer. In Region III, there was no relationship between respondents' educational level ($\chi_3^2 = 1.29$, df = 4, $p \geq .05$) or residence ($\chi_3^2 = 8.16$, df = 5, $p \geq .05$) and their participation in these types of non-consumptive deer-related activities.

Approximately 56 percent of the Type IV non-consumptive deer users in Region I, 53 percent in Region II

Table 11.--Characteristics of questionnaire respondents who had engaged in Type IV uses of Michigan deer during the previous year.

Characteristics	Region I		Region II		Region III	
	Type IV Deer Users (N=538)	All Others (N=288)	Type IV Deer Users (N=531)	All Others (N=355)	Type IV Deer Users (N=272)	All Others (N=425)
Sex						
% Male	58%	49%	56%	47%	62%	49%
% Female	42%	51%	44%	53%	38%	51%
Marital Status						
Single	13%	12%	11%	10%	17%	14%
Married	78%	78%	80%	78%	73%	74%
Divorced	4%	3%	5%	6%	7%	6%
Widowed	5%	7%	4%	6%	3%	6%
Children at Home						
Yes	52%	54%	51%	52%	52%	50%
No	48%	46%	49%	48%	48%	50%
Education						
Grade School	6%	7%	6%	8%	8%	7%
High School	41%	36%	38%	25%	35%	32%
Some College	26%	20%	25%	25%	26%	28%
College Degree	13%	19%	15%	26%	15%	15%
Graduate Degree	14%	18%	16%	16%	16%	18%

Table 11.--Continued.

Characteristics	Region I		Region II		Region III	
	Type IV Deer Users (N=538)	All Others (N=288)	Type IV Deer Users (N=531)	All Others (N=355)	Type IV Deer Users (N=272)	All Others (N=425)
Age Class						
0-26 years	17%	15%	14%	9%	14%	11%
27-40 years	34%	32%	29%	32%	34%	33%
41-65 years	41%	45%	50%	50%	57%	51%
66+ years	8%	8%	7%	9%	5%	5%
Mean Age	42.43	43.40	43.72	45.46	41.50	43.44
Present Residence						
Major City	0%	0%	0%	0%	15%	20%
Medium City	1%	2%	2%	3%	12%	12%
Suburb	1%	1%	2%	4%	21%	26%
Small City	12%	18%	21%	33%	20%	17%
Town	60%	60%	41%	43%	16%	14%
Rural	26%	19%	34%	17%	16%	11%
Childhood Residence						
Major City	13%	13%	15%	19%	8%	12%
Medium City	8%	9%	9%	12%	8%	8%
Suburb	5%	9%	8%	7%	8%	8%
Small City	16%	14%	16%	15%	18%	20%
Town	35%	37%	30%	27%	32%	31%
Rural	22%	16%	21%	19%	26%	21%
Multiple	1%	2%	1%	1%	0%	0%

Table 11.--Continued.

Characteristics	Region I		Region II		Region III	
	Type IV Deer Users (N=538)	All Others (N=288)	Type IV Deer Users (N=531)	All Others (N=355)	Type IV Deer Users (N=272)	All Others (N=425)
Occupation						
Homemaker	19.3%	30.1%	18.5%	26.7%	14.7%	20.8%
Technical/Professional	14.9%	13.0%	12.8%	17.4%	15.7%	17.1%
Unskilled Labor	12.4%	5.9%	10.9%	5.1%	12.1%	12.9%
Managerial	10.5%	6.7%	11.4%	11.0%	11.2%	10.3%
Skilled Labor	8.5%	5.9%	9.5%	2.7%	11.9%	6.3%
Secretarial/Clerical	6.4%	12.1%	5.5%	7.9%	5.9%	10.8%
Educational	8.0%	9.6%	8.5%	9.2%	7.0%	7.6%
Retired	10.5%	9.2%	10.4%	10.6%	4.5%	5.8%
All Others	9.5%	7.5%	12.5%	9.4%	17.0%	8.4%

and 47 percent in Region III had at some time hunted deer. This was in contrast to 34 percent, 33 percent and 31 percent of other people in the respective regions who had at some time hunted deer. Twenty-five percent of the non-consumptive users were current deer hunters, as compared with less than 5 percent of the other people. In both groups, about one in four of the respondents not currently hunting deer had hunted deer at least once in their lives. Having hunted deer at least once did not, then, predispose an individual to engage in Type IV non-consumptive deer use.

The attitudes of respondents who drove or hiked to view deer or attempted to photograph deer were compared with the attitudes of people who did not participate in these activities (Table 12). Type IV deer users were less opposed to hunting than people not engaging in Type IV uses of deer ($\chi_1^2 = 13.70$, df = 3, $p < .05$; $\chi_2^2 = 59.67$, df = 3, $p < .05$; $\chi_3^2 = 22.61$, df = 3, $p < .05$). They were also more likely to want additional deer in the state ($\chi_1^2 = 50.64$, df = 3, $p < .05$; $\chi_2^2 = 52.82$, df = 3, $p < .05$; $\chi_3^2 = 26.45$, df = 3, $p < .05$). In Region I, respondents who were Type IV deer users disagreed more often with the statement that, "deer are abundant in Michigan" than people who were not involved in Type IV uses ($\chi_1^2 = 15.96$, df = 3, $p < .05$). In contrast, there was no significant difference in the responses of these

Table 12.--Attitudes of questionnaire respondents who had engaged in Type IV uses of Michigan deer during the previous year.

	Region I		Region II		Region III	
	Type IV Deer Users (N=538)	All Others (N=288)	Type IV Deer Users (N=531)	All Others (N=355)	Type IV Deer Users (N=272)	All Others (N=425)
Deer are abundant in Michigan.						
Strongly Agree	6%	5%	9%	10%	7%	7%
Agree	31%	45%	51%	56%	49%	50%
Disagree	51%	39%	32%	29%	37%	39%
Strongly Disagree	12%	11%	8%	5%	7%	4%
We should have more deer in Michigan.						
Strongly Agree	41%	28%	30%	15%	28%	16%
Agree	51%	46%	54%	50%	57%	58%
Disagree	7%	23%	14%	31%	13%	25%
Strongly Disagree	1%	3%	2%	4%	2%	1%
There are too many other problems, like inflation, to worry about deer.						
Strongly Agree	3%	4%	3%	5%	1%	5%
Agree	4%	9%	4%	15%	6%	13%
Disagree	44%	54%	54%	55%	49%	54%
Strongly Disagree	49%	31%	39%	25%	44%	28%

Table 12.--Continued.

	Region I		Region II		Region III	
	Type IV Deer Users (N=538)	All Others (N=288)	Type IV Deer Users (N=531)	All Others (N=355)	Type IV Deer Users (N=272)	All Others (N=425)
I approve of hunting.						
Strongly Agree	30%	20%	27%	13%	23%	12%
Agree	52%	54%	55%	55%	52%	50%
Disagree	10%	14%	10%	15%	11%	18%
Strongly Disagree	8%	12%	9%	17%	14%	21%

two groups in either Region II ($\chi_2^2 = 4.35$, df = 3, $p \geq .05$) or Region III ($\chi_3^2 = 3.09$, df = 3, $p \geq .05$).

As expected, Type IV deer users had seen more deer in the past 12 months and had seen more signs of deer than people not engaging in Type IV use (Table 13).

People who engaged in hiking or driving to look for deer or who attempted to photograph deer more often expressed sighting preferences as compared with people not engaging in these activities. Aside from this, specific preferences were no different than people not engaging in Type IV use of deer (Table 14). Sighting preferences of Type IV users were also the same as those of deer hunters.

Type V Uses of Michigan Deer

This type of use included seeing deer or deer signs while involved in some activity other than the active pursuit of deer. Type V non-consumptive uses were studied in reference to other outdoor recreational activity. People were asked to indicate their most frequent recreational activity during the 12 months prior to receiving the questionnaire. They were then asked:

> "How much does seeing deer add or detract from your enjoyment of this activity?"
>
> "How much does seeing wildlife, other than deer, add or detract from your enjoyment of this activity?"

Table 13.--Experience with deer among people who participated in Type IV uses of Michigan deer.

	Region I		Region II		Region III	
	Type IV Deer Users (N=538)	All Others (N=288)	Type IV Deer Users (N=531)	All Others (N=355)	Type IV Deer Users (N=272)	All Others (N=425)
Deer sightings in Michigan during the past twelve months						
Never saw a wild deer	0%	4%	0%	5%	7%	23%
0 deer seen	6%	19%	7%	21%	19%	39%
1-10 deer seen	47%	52%	37%	45%	50%	32%
11-50 deer seen	28%	17%	29%	16%	16%	4%
More than 50 deer seen	19%	8%	27%	13%	8%	2%
Deer signs seen in Michigan						
Deer tracks	96%	80%	96%	79%	83%	54%
Deer trails	91%	67%	91%	67%	75%	44%
Deer beds	72%	42%	70%	43%	50%	26%
Deer yards	67%	41%	52%	33%	40%	16%
Deer droppings	85%	61%	82%	60%	67%	37%

Table 14.--Preferences for conditions of viewing deer among Type IV users of Michigan deer.

Condition and Response	Region I		Region II		Region III	
	Type IV Deer Users (N=538)	All Others (N=288)	Type IV Deer Users (N=531)	All Others (N=355)	Type IV Deer Users (N=272)	All Others (N=425)
Numbers						
1 deer	4%	5%	4%	3%	3%	5%
10 deer	42%	36%	46%	39%	54%	42%
100 deer	11%	4%	8%	6%	10%	7%
No Preference	43%	55%	42%	52%	33%	46%
Sex-Age Class						
Buck	23%	19%	21%	14%	25%	16%
Doe	4%	2%	3%	3%	4%	2%
Fawn	11%	13%	12%	14%	14%	16%
No Preference	62%	66%	64%	69%	57%	66%
Social Group						
Bachelor Group	9%	6%	8%	5%	13%	7%
Family Group	47%	43%	49%	46%	46%	43%
No Preference	44%	51%	43%	59%	41%	50%
Season						
Winter	4%	5%	7%	4%	8%	4%
Spring	8%	8%	7%	6%	8%	5%
Summer	8%	10%	5%	3%	9%	8%
Autumn	25%	19%	24%	20%	25%	23%
No Preference	55%	58%	57%	67%	50%	60%

Table 14.--Continued.

Condition and Response	Region I		Region II		Region III	
	Type IV Deer Users (N=538)	All Others (N=288)	Type IV Deer Users (N=531)	All Others (N=355)	Type IV Deer Users (N=272)	All Others (N=425)
Habitat						
Field	16%	21%	26%	24%	24%	22%
Forest	44%	35%	39%	33%	38%	32%
Lake Shore	4%	5%	4%	4%	4%	6%
Highway	1%	2%	1%	1%	1%	0%
No Preference	35%	37%	30%	38%	33%	40%

"How much does seeing deer signs (tracks, etc.) add or detract from your enjoyment of this activity?"

"How much does just knowing deer are in the area add or detract from your enjoyment of this activity?"

Type V wildlife use, or incidental observation, may be of significant value as one component in determining the quality of outdoor recreation. Approximately 89 percent of the respondents felt that seeing deer added to the enjoyment of their most frequent recreation (Table 15). People involved in different kinds of recreation did not respond similarly to the question (Table 16). Seeing deer added most to the enjoyment of small game hunting, deer hunting, camping and hiking. It was reported to be less important to the enjoyment of bird watching, boating or canoeing, downhill or cross-country skiing, and swimming.

Type VI Uses of Michigan Deer

This use of deer involved symbolic or conceptual activities such as reading about deer or watching television shows about deer. Type VI use of deer was measured with a set of nine items involving specific deer-related activities. The percentage of people in a region engaging in each activity was calculated (Table 17), as well as the frequencies for only those people participating at least once (Table 18).

Table 15.--The degree to which seeing deer, seeing wildlife other than deer, and seeing deer signs added to the quality of respondent's favorite outdoor recreation.

Region	Item	Response				
		Adds a lot	Adds a little	Neither adds nor detracts	Detracts a little	Detracts a lot
I	Seeing deer	83%	11%	6%	0%	0%
	Seeing other wildlife	80%	15%	5%	0%	0%
	Seeing deer signs	52%	30%	17%	1%	0%
	Knowing deer are in area	59%	26%	15%	0%	0%
II	Seeing deer	80%	10%	10%	0%	0%
	Seeing other wildlife	77%	15%	8%	0%	0%
	Seeing deer signs	49%	28%	23%	0%	0%
	Knowing deer are in area	59%	24%	17%	0%	0%
III	Seeing deer	73%	16%	10%	1%	0%
	Seeing other wildlife	74%	17%	8%	1%	0%
	Seeing deer signs	41%	30%	28%	1%	0%
	Knowing deer are in area	51%	28%	20%	1%	0%
State Weighted Means	Seeing deer	74%	15%	10%	1%	0%
	Seeing other wildlife	74%	17%	8%	1%	0%
	Seeing deer signs	42%	30%	28%	0%	0%
	Knowing deer are in area	52%	28%	20%	0%	0%

Table 16.--The degree to which seeing deer "adds a lot" to the quality of different types of outdoor recreation.

Rank	Recreation	Number of Respondents by Region			Percentage "Adds a lot"/ Total
		I	II	III	
1	Small game hunting	43	42	19	98%
2	Deer hunting	107	80	90	88%
3	Camping	24	24	16	88%
4	Hiking	76	76	46	85%
5	Trailbike riding	13	9	6	84%
6	Nature photography	11	8	6	83%
7	Fishing	142	131	78	79%
8	Snowmobiling	25	22	9	78%
9	Scenic driving	161	162	151	75%
10	Birdwatching	23	32	10	70%
11	Boating/Canoeing	26	61	43	63%
12	Skiing	29	23	15	54%
13	Swimming	33	64	61	52%

Table 17.--Percentages of questionnaire respondents who engaged in Type VI deer-related activities at least once during the previous year.

Activity	Region I (N=826)	Region II (N=886)	Region III (N=697)	Weighted Means for Michigan
Watching TV programs about deer	57%	60%	53%	54%
Talking to friends about deer	70%	68%	52%	54%
Reading newspaper articles about deer	60%	54%	46%	47%
Reading magazine articles about deer	48%	44%	36%	37%
Reading DNR publications about deer	30%	24%	13%	15%
Reading books about deer	18%	16%	13%	13%
Doing scientific research on deer	2%	2%	2%	2%
Attending community meetings about deer	4%	2%	1%	1%
Attending lectures about deer	2%	1%	0%	1%

Table 18.--Mean number of times that participants engaged in Type VI deer-related activities during the previous year.

Activity	Region I (N=826)	Region II (N=886)	Region III (N=697)	Weighted Means for Michigan
Watching TV programs about deer	7.6	6.7	5.0	5.2
Talking to friends about deer	26.0	25.2	16.1	17.2
Reading newspaper articles about deer	8.8	8.1	5.0	5.4
Reading magazine articles about deer	5.4	6.3	4.9	5.0
Reading DNR publications about deer	4.8	4.4	14.6	13.3
Reading books about deer	4.4	5.5	5.5	5.5
Doing scientific research on deer	2.8	29.4	1.9	4.1
Attending community meetings about deer	1.9	4.2	10.0	9.2
Attending lectures about deer	1.8	5.6	1.6	1.9

A "Type VI deer user" was defined as any respondent who had engaged in at least one of these activities during the prior year. This included 86 percent of respondents in Region I, 86 percent in Region II, and 77 percent of those in Region III.

Some of the people participating in Type VI deer uses did not hunt deer and did not actively search for deer for other purposes. These people included 15 percent of the Region I, 16 percent of the Region II and 26 percent of the Region III respondents. Statewide, this would represent one in four respondents. The sample ratio of deer hunters and "Type VI (only)" deer users to the total number of deer hunters in 1974 was used to estimate that 1.3 million Michigan people were in this group.

In Regions I and II, Type VI (only) deer users were more educated (Table 19) than Type IV deer users ($\chi_1^2 = 27.36$, df = 4, $p < .05$; $\chi_2^2 = 10.57$, df = 4, $p < .05$). Type VI (only) and Type IV deer users had similar levels of education in Region III ($\chi_3^2 = 6.22$, df = 4, $p \geq .05$). People involved only in Type VI activities were also more urbanized than Type IV deer users ($\chi_1^2 = 14.26$, df = 5, $p < .05$; $\chi_2^2 = 98.98$, df = 5, $p < .05$; $\chi_3^2 = 13.38$, df = 5, $p < .05$). They had seen fewer deer and deer signs (Table 20) than Type IV users. Although there was no difference in their estimates of deer abundance (Table 21), people who only participated

Table 19.--Characteristics of people who participated only in Type VI uses of Michigan deer.

	Region			Weighted Means for Michigan
	I (N=124)	II (N=142)	III (N=178)	
Sex				
% Male	46%	45%	54%	54%
% Female	54%	55%	46%	46%
Marital Status				
Single	10%	13%	14%	14%
Married	83%	75%	75%	76%
Divorced	3%	6%	7%	6%
Widowed	4%	6%	4%	4%
Children at Home				
Yes	40%	50%	48%	48%
No	60%	50%	52%	52%
Education				
Grade School	2%	5%	4%	4%
High School	35%	28%	30%	30%
Some College	16%	24%	33%	33%
College Degree	26%	26%	13%	14%
Graduate Degree	21%	17%	20%	19%
Age Class				
0-26	17%	11%	10%	9%
27-40	30%	28%	35%	35%
41-65	41%	53%	51%	52%
66+	12%	6%	4%	4%
Present Residence				
Major City	0%	0%	22%	19%
Medium City	3%	1%	12%	11%
Suburb	1%	4%	28%	26%
Small City	23%	31%	20%	22%
Town	54%	45%	8%	11%
Rural	19%	19%	10%	10%

Table 19.--Continued.

	Region			Weighted Means for Michigan
	I (N=124)	II (N=142)	III (N=178)	
Childhood Residence				
Major City	13%	19%	12%	13%
Medium City	7%	10%	9%	9%
Suburb	9%	8%	8%	8%
Small City	14%	13%	18%	18%
Town	39%	29%	32%	31%
Rural	17%	21%	21%	21%
Multiple	1%	0%	0%	0%
Occupation				
Homemaker	25.6%	23.0%	14.6%	15.7%
Technical/ Professional	15.9%	18.0%	19.9%	19.6%
Unskilled Labor	3.3%	5.0%	11.7%	10.8%
Managerial	8.3%	8.7%	10.5%	10.2%
Skilled Labor	5.7%	2.9%	6.4%	6.1%
Secretarial/ Clerical	12.8%	5.8%	11.1%	10.9%
Educational	12.6%	15.8%	7.5%	8.4%
Retired	5.8%	7.8%	5.8%	6.0%
All Others	10.0%	13.0%	12.3%	12.3%

Table 20.--Experience with deer among people who only participated in Type VI uses of Michigan deer.

	Region			Weighted Means for Michigan
	I (N=124)	II (N=142)	III (N=178)	
Deer sightings in Michigan during the past twelve months				
Never saw a wild deer	2%	3%	19%	17%
0 deer seen	25%	20%	45%	45%
1-10 deer seen	54%	48%	33%	35%
11-50 deer seen	14%	18%	3%	5%
More than 50 deer seen	5%	11%	0%	0%
Deer signs seen in Michigan				
Deer tracks	86%	86%	61%	64%
Deer trails	72%	67%	51%	53%
Deer beds	40%	40%	29%	31%
Deer yards	35%	36%	20%	22%
Deer droppings	63%	63%	45%	47%

Table 21.--Attitudes of people who only participated in Type VI uses of Michigan deer.

	Region			Weighted Means for Michigan
	I (N=124)	II (N=142)	III (N=178)	
Deer are abundant in Michigan.				
Strongly Agree	7%	10%	5%	5%
Agree	35%	50%	50%	50%
Disagree	48%	33%	40%	40%
Strongly Disagree	10%	7%	5%	5%
We should have more deer in Michigan.				
Strongly Agree	29%	14%	16%	16%
Agree	49%	55%	59%	59%
Disagree	20%	28%	25%	25%
Strongly Disagree	2%	3%	0%	0%
There are too many other problems, like inflation, to worry about deer.				
Strongly Agree	2%	2%	2%	2%
Agree	6%	10%	8%	8%
Disagree	54%	54%	54%	55%
Strongly Disagree	38%	34%	36%	35%
I approve of hunting.				
Strongly Agree	16%	10%	14%	14%
Agree	57%	56%	48%	49%
Disagree	14%	13%	15%	14%
Strongly Disagree	13%	21%	23%	23%

in Type VI deer-related activities were less likely to want more deer in Michigan. They were also more likely to be opposed to hunting than those respondents engaging in Type IV (intentional observation) activities (χ_1^2 = 12.09, df = 3, $p < .05$; χ_2^2 = 35.95, df = 3, $p < .05$; χ_3^2 = 11.51, df = 3, $p < .05$).

Non-Users

Fifteen percent of the respondents in Region I, 21 percent in Region II and 33 percent in Region III had not been involved in any activities related to Michigan deer. They did not hunt deer, did not intentionally attempt to view or photograph deer (Type IV activities), and did not participate in symbolic or conceptual (Type VI) deer-related activities. Approximately 76 percent of these non-users had seen a wild deer, 36 percent had seen a deer in the past year, and only 52 percent had seen a deer track. About 32 percent of these people disagreed or strongly disagreed that we should have more deer in Michigan and 25 percent felt that there were too many other problems in Michigan to worry about deer. Finally, 41 percent of the non-users were opposed to hunting.

DISCUSSION

Human societies derive many benefits from wildlife resources. At the utilitarian level, wildlife resources provide food, furs and commercial profits. Some benefits are at a recreational level, including such activities as hunting for sport, wildlife observation and conceptual recreation. Wildlife also has significant educational benefits since man is curious about other species and laws of nature. The expanding commercial market in wildlife art and wildlife crafts demonstrates another aspect of public benefit, that of esthetics. Another benefit is that of philosophical value. Many people derive benefits from knowing that a species is thriving in a remote area even if they will never see or hunt the species in its native habitat. Some people might also be concerned with the moral responsibility of man to conserve wildlife resources. Finally, there are ecological benefits of wildlife. Man's existence, as well as the structure and function of his civilization, may depend on wildlife communities.

This present analysis of deer use in Michigan has established categories of some public uses of one species,

has measured the magnitude of its uses and has correlated these measures with public attitudes, behaviors, and characteristics. There is a distinction between public benefits and public uses. "Use" denotes a set of human behaviors or activities while "benefit" refers to the positive consequences of these behaviors to the individual or society. In certain cases, a public use may have no public benefit or may even represent a social cost. This study focused on public use as a first step towards determining benefits, or the consequences of public behavior.

Types I, II and III Uses of Michigan Deer

No data were collected on either of the two types (I and II) of consumptive uses or on non-consumptive uses by hunters who were not successful in harvesting a deer (Type III).

Type IV Uses of Michigan Deer

These uses involved intentional search in order to view or photograph, but not harvest, deer. Measurement included three scale items: driving vehicles to look for deer, hiking to look for deer and attempting to photograph wild deer.

Comparisons with Other Studies

Hendee (1969) used the term "appreciative uses" to describe such wildlife-oriented activities as photography, nature interpretation, research and viewing. He

reported that the demand for these was increasing at a faster rate than the demand for consumptive uses. There is no way either to refute or to support his contention with data collected during one season on deer alone. Evidently, though, this type of use is an important one in Michigan because there were three respondents who watched or photographed deer for every one who hunted deer.

Aney and Cowan (1975) reported that there were more non-consumptive wildlife users than hunters in Oregon. There, 95 percent of the adult population participated in wildlife-oriented activities, such as watching movies or TV programs about wildlife (88%), viewing wildlife (51%), feeding birds (48%), reading books or articles on wildlife (46%) or photographing wildlife (13%). Those Oregonians most likely to spend time viewing wildlife were younger than non-viewers and had either lower or higher incomes than non-viewers. Other variables such as sex, race, occupation, education and marital status were similar to those of people not involved in wildlife-viewing activities (Aney and Cowan 1974).

Horvath (1974) found that only a small proportion of the public in the southeastern United States engaged in non-consumptive wildlife recreation yet "value received" estimates were higher for wildlife enjoyment ($12.3 billion) than for hunting ($3.9 billion) or fishing

($7.9 billion). Horvath found that non-consumptive wildlife users spent more recreation-days in their sport than did hunters. This accounted for the higher value received estimate for non-consumptive use. Young people were more likely to be involved in non-consumptive wildlife activities. Participation increased as annual family income approached $15,000 per year and decreased as income rose above that figure.

In New Jersey, Applegate (1974) found that non-consumptive users of the Great Swamp National Wildlife Refuge were younger, and had higher levels of education than hunters using Fish and Wildlife Management Areas.

In Michigan, males were more likely to drive to look for deer, hike to look for deer or try to photograph deer than females. In the two northern regions (I and II), Type IV participants were less educated. In Region II they were more rural than other respondents. However, in Region III, there was no relationship between education or residence and participation in Type IV deer uses. Differences in characteristics of non-consumptive users were found between regions within the state.

Many of the findings in this study were different than those in the three studies cited. Some of this discrepancy arises from a lack of consistency in definition and measurement of non-consumptive wildlife use. The present study found differences in characteristics,

attitudes and numbers of people participating in different forms of non-consumptive use of the same species. For example, Type IV (intentional observation) deer users were younger, more often male, less educated and more rural than Type VI (symbolic or vicarious activities) deer users.

Another reason for differences in findings is that the present study concerned a single species while others referred to general wildlife. Differences have been found between consumptive users who hunt different species. For example, in Wisconsin, small-game hunters tended to be younger, have more education and higher incomes than deer hunters (Klessig and Hale 1972). It is also likely that people who view or photograph deer are different, in background and life style, than people primarily interested in viewing other species.

Given these problems, it is meaningless to compare studies, and difficult to develop a coherent body of knowledge about non-consumptive uses and benefits of wildlife. Uniform definitions, a standardized taxonomy of human activities, and a system of measurement which is species-specific and comparable across studies are needed.

Attitudes of Participants

People who drove or hiked to search for deer or attempted to photograph deer were less opposed to hunting than those respondents not engaging in these activities.

It is possible that encouraging people to actively participate in Type IV wildlife observation might reduce opposition to sport hunting. It is just as possible that these Type IV users were initially less opposed to hunting before developing an interest in non-consumptive use of deer. The former argument assumes a cause-effect relationship which must be tested experimentally.

An interesting finding was that both deer hunters and Type IV deer users who did not hunt had nearly identical preferences for conditions under which they wanted to observe deer. People who drove or hiked to search for deer or attempted to photograph deer preferred viewing deer in autumn. They also preferred seeing a buck, compared to a doe or fawn. The majority of Type IV users preferred forest habitats as places to view deer.

This similarity in viewing preferences between hunters and non-consumptive users might present some management problems. This also suggests that a large amount of viewing activity may relate to scouting trips where deer hunters and perhaps their families look for deer or deer signs prior to the opening day of hunting season. It is possible that the tradition of watching deer, especially in northern Michigan communities, is related to the traditions which surround firearm deer hunting. Few people in these areas are unaffected by the mystique, intrigue and festivity of an impending deer

season, be they hunters or not. Non-consumptive deer use, especially Type IV uses, may not be incompatible with hunting. Rather, both of these public uses may be largely motivated by traditions surrounding firearm deer season. Similar processes seem likely to be involved in non-consumptive use of other game species. Evidence collected to support a background of common tradition is that Type IV deer users were less opposed to hunting than other people.

The aura of a photographic safari in Africa is certainly enhanced by the mystique surrounding the African big-game hunter (Petrides, in conversation).

Management Concerns

A few wildlife agencies have included Type IV non-consumptive wildlife use in management plans. Colorado's plan to the year 1990 calls for the creation of 3.3 million days of sport hunting and trapping and 2.8 million days of non-consumptive wildlife recreation for use of terrestrial game species. Another 9.5 million days of non-consumptive use of terrestrial non-game species are proposed as an additional objective (Colorado Division of Wildlife 1974).

In Michigan, much thought has been given to non-consumptive use of wildlife but usually in reference to non-game species. No formal management plans have been developed yet for such uses. As mentioned, current

management plans include an objective of having 1,000,000 deer in Michigan by 1980. Once this objective has been attained, it will be possible to increase the benefits from this herd by managing deer for non-consumptive, as well as hunting benefits. Justification for such a program is based upon an analysis of public behavior as described in this study. There were three people who drove or hiked to search for deer or attempted to photograph deer for every person who hunted deer. As further evidence of this need, deer hunters showed the highest participation rates in Type IV and Type VI non-consumptive deer uses. These are the clients who financially support deer management and who would benefit most from increased opportunities for non-consumptive deer-related activities.

Consider two separate deer management strategies. One strategy would be designed to produce deer for hunters during hunting seasons. No concern would be given to human benefits during the remaining ten months of the year. The opposing management system would be designed to provide only for non-hunting recreation. No concern would be shown for hunter bag success. In the second case, hunting season regulations would be set only to control herd size so as to maximize out-of-season sighting rates. Obviously, neither of these management systems alone would result in optimizing both in and out-of-season benefits of deer to people. One solution might be to

increase the rate at which people see deer. This would involve managing the behaviors of both people and deer.

Several factors might operate to determine deer-sighting rates other than the absolute numbers of animals. Factors such as weather, time of day or seasonal behavior of deer (e.g., rutting, fawning) cannot be controlled. Manageable factors might include density of recreationists, skill of recreationists, road and trail design and distribution of vegetation. Specific types of hunting regulations may also influence both in and out-of-season sighting rates. For example, Behrend and Lubeck (1968) reported that summer flight distances of deer were longer on areas where animals were hunted as compared with flight distances of deer on unhunted areas. They also found that yearling bucks had the shortest flight distances, suggesting that flight distance is a learned and not inherited characteristic. One possible consequence of this might be that prolonged and heavy antlerless deer hunting seasons would tend to lower out-of-season sighting rates. Consecutive antlerless seasons might reduce sighting rates the most, while a more intense antlerless season every third year might lower out-of-season sighting rate the least.

An objection to increasing the rate at which a stable herd is seen by people is that illegal kill might increase as deer become more visible. Another objection

is that deer might become "tame" and that the conflict between the hunter and anti-hunter would then increase. In addition, increased visibility may actually lower the value of deer sightings to the public.

Part of the difficulty in managing a species for both the hunter and non-hunter involves conflicts between people. In recent thinking about this problem there has been a general tendency to zone conflicting uses in space or time. For example, Applegate (1974) suggested that areas with game management programs should not be developed for non-consumptive wildlife use because of possible conflicts between hunters and non-hunters. Some of the basis for the research on southern Michigan game areas (Heezen 1975; Belyea and Lerg 1975) was to identify recreational uses which were in conflict with hunting and those which were compatible. Presumably, compatible uses could be allowed to occur simultaneously while conflicting uses might be restricted by legislation or zoned in space and time. One basic problem with this management approach is that conflicts are reinforced by regulating agencies. A more appropriate, but difficult, solution is for managers to coordinate and monitor the resolution of conflict by encouraging the interaction of hunters and non-consumptive users. This might first be done in an experimental setting.

Directions for Future Research

1. What variables influence the visibility of deer?
2. Which of these variables can be manipulated to increase sighting rates and by what methods?
3. What geographical areas within the state, if managed to make deer more visible, would produce greatest benefits to most people?
4. What existing programs in land use would have to be considered (i.e., forestry, watershed management, deer products, etc.)?
5. What effect would increasing the visibility of deer for non-consumptive use have on poaching rates? How could the probable increase in illegal kill be minimized?
6. If Type IV non-consumptive uses were encouraged, what conflicts would develop between hunters and non-hunters? How could they be resolved?

Type V Uses of Michigan Deer

Most respondents (89%) said that seeing deer added to their recreational experience even though they were not specifically looking for them. Wildlife sightings may be important components in the quality of some recreational activities. Among non-hunting recreations, seeing a deer added most to camping and hiking. The quality of boating, canoeing, skiing and swimming were less influenced by incidental deer sightings. It was not possible in this

study to determine whether these differences were due to characteristics of the people who engaged in these recreations or to the nature of the recreational activities.

Incidental sightings are probably the most common type of people-wildlife encounter. Many recreationists may visit wildlife habitats for reasons other than the specific desire to see one species. Applegate (personal communication) felt that a large number of people visiting a New Jersey wildlife area were responding to many dimensions of the area. The type of non-consumptive use that he discussed (Applegate 1974) was not always wildlife specific and was only rarely species-specific.

There may be groups of people who respond to the whole of an ecological community rather than to that part involving one species. Some of these individuals might respond to groups of species. For example an individual may visit a marsh and be interested in viewing waterfowl, regardless of the species. Other individuals might be involved in appreciating the habitat type, rather than a group of species. An example of this might be an individual who is going to hike on a forest trail. This person may be drawn by any one of several components of the forest ecosystem, rather than one particular wildlife species. There are probably a large number of people who visit wildlife habitats and who are attracted by the social behavior which that environment permits. A good example

of this might be the case where a father takes his children out in order to teach them something about wildlife. The father may not be as concerned with the species as he is with his role in interacting with the children.

There are also more specific cases where outdoor recreationists may or may not be concerned with wildlife. This probably is a function of the motivation for participating in the given recreation, characteristics of people who enjoy that recreation, and may also relate to the nature of the recreation itself. People expressing different motivations for participation may respond differently to the value of seeing wildlife. For example, in this study, one individual said that his favorite recreation was racing kayaks and that he had no time to look for deer. Obviously this person perceived the wildlife-related components of his recreation as of minimal importance, as compared with other kayak enthusiasts who float rivers at a more leisurely pace.

In some cases of Type V wildlife use, a recreationist may be actively involved in looking for wildlife while not recognizing this consciously nor responding to this on a mail questionnaire. An example of this situation was encountered during a use survey of a forested area which had been clearcut to increase deer numbers (Langenau et al. 1975). An individual was interviewed who was driving a trailbike through some especially good deer

habitat at dusk. His trailbike had been rebuilt to have a special place for photographic equipment, including a tripod which was permanently affixed. When this person returned a postcard asking what recreation he had done on the area, he wrote "trailbike riding" and did not indicate that he had taken photographs of wildlife.

Management Concerns

Different recreationists were found to place different values on incidental deer sightings. The management implications of this are that the type of wildlife management in an area should be matched to the recreational potential of that habitat. If one objective of a program is to increase the non-hunting benefits of wildlife to general recreationists, then those wildlife species should be favored which are valued most. If this is not feasible at specific sites, the alternative is to recruit or guide specific recreationists to areas which have high numbers of the wildlife species valued most by that recreationist.

The management of a unit of land for several wildlife species would probably have more priority than single-species management if Type V non-consumptive wildlife uses were encouraged. Any given unit of land might have several different types of recreationists, each with its own set of species which were valued for incidental sightings. The problem would be even more

difficult if the number of people who respond at a community, and not species level, use the area. One long-range solution to this problem would be to give community level wildlife management a greater priority. Wildlife agencies appear to be staffed with species biologists, such as pheasant, waterfowl or deer specialists. Perhaps it would be better to encourage community orientations. It seems that the human recreationists would be better understood if viewed as part of the habitat which is selected as a place to recreate.

Directions for Future Research

1. Is wildlife observation a large enough component of recreational quality to justify management strategies for non-hunters?
2. How much do incidental sightings of specific wildlife species, other than deer, add to the quality of various recreations?
3. How much of the value of Type V incidental observation is species specific and how much is community-oriented?
4. Is there a decreasing value for each additional sighting of the same species?
5. Is species diversity related to public benefit from incidental wildlife sightings (Applegate, personal communication)?

Type VI Uses of Michigan Deer

More than 6 million Michigan people were estimated to be involved in conceptual uses of deer such as watching TV programs on deer and reading about deer. In contrast to the other five uses, these activities were only rarely done out-of-doors.

As a group, people who did not hunt deer, did not try to view or photograph deer, but who were still involved in Type VI deer-related activities were more urban and had attained higher educational levels than other respondents. Although there was no difference between these people and other respondents in their perception of how abundant deer were, they were less likely than others to want additional deer in the state.

As society becomes more urbanized and people become better educated, it is likely that these Type VI uses of wildlife will become more important. The social responsibility of state natural resource departments to satisfy such educational and recreational demands is uncertain, especially because funding is usually derived from consumptive users.

Management Concerns

Nearly six million people in Michigan are involved in some kind of Type VI (conceptual and symbolic) use of deer at least once during the year. It is the responsibility of the wildlife profession to help satisfy the

demand for this type of resource use and to teach people about wildlife.

This type of people management necessarily involves communications media. The problem which arises is to present biological facts in a setting which is both accurate and entertaining in order to reach the most people. The entertainment built into such communication does not require portraying an anthropomorphic view of wildlife species.

Some educational goals should be established, based upon existing public knowledge about deer. At present, we have no data on the level of existing knowledge nor any management policy which would set such criteria.

A hypothetical example will be used to illustrate ways in which an objective could be set and achieved. Actual data are sorely needed, but are not available. If, for example, the Michigan public were asked to respond to the following statements,

		Hypothetical Percentage of the Public Knowing Each Fact
1.	Fawns are spotted at birth.	82%
2.	Twins are common in deer.	62%
3.	Deer eat tree twigs in winter.	60%
4.	More fawns are born each year than food on the range can support.	10%
5.	Deer have a 4-chambered stomach like cows.	2%

one could determine which misconceptions exist and how seriously these misconceptions hinder specific programs in managing wildlife. In this hypothetical example, it might be found that public lack of knowledge about deer productivity would make it difficult to gain public acceptance for harvesting antlerless deer. One might also assume that the misconceptions about the nature of a deer's stomach would not be related to public acceptance of antlerless seasons.

Research would then be needed to determine target levels of knowledge which would permit management techniques and programs to be enacted. For example, perhaps antlerless seasons would be accepted if 87 percent of the public knew that twin fawns were common. Objectives would then be to increase (from 62 to 87%) public knowledge that twins are common but not necessarily to increase public knowledge about deer stomachs.

Once goals are established, it would be possible to select appropriate educational media to influence the number of people who know a given fact about deer which is important to their understanding of a wildlife management program. Target audiences where misconception has most effect in inhibiting program acceptance should also be identified.

Directions for Future Research

1. What do people know, or think they know, about deer?
2. Which misconceptions create the most serious problems for applying contemporary and future management techniques?
3. Which groups of the public are most often involved in management-public problems? What misconceptions about deer are held by these groups?
4. What communication media and methods are most effective in changing knowledge and attitudes about deer?

Specific Recommendations

After the facts which would be helpful for the public to learn are determined, then it might be possible to incorporate the following suggestions:

1. Watching television shows about deer was a very common form of Type VI non-consumptive deer use. Wildlife managers should create more of such movies for television.
2. Reading newspaper articles about deer was also a very frequent appreciative use. In a few instances journalists know a great deal about wildlife but in most cases this is not so. Communication between wildlife people and journalists should be improved. The public should be made aware of

the dangers of appealing to man's emotional ties with wildlife species.

3. Deer-education centers should be considered. These centers could have displays about life histories, the role of hunting in wildlife population dynamics and ecological communities in which deer are common. They could also have film showings for school classes and the general public.
4. Management demonstration areas should be considered. Tracts of land could be set aside so that habitat manipulation for wildlife production could be applied, described to the public by nature interpreters. Signs containing pertinent information could also be displayed to promote self-interpretation.

Non-Use

About one-third of Michigan taxpayers are in no way involved with deer. Nearly half of these non-users said they had never seen a deer track. Over 40 percent of this large group was opposed to hunting. If these people were exposed to wildlife and to information about wildlife, would they become less opposed to hunting and more concerned with the wildlife resource?

CONCLUSION

There are many kinds of people, from all walks of life and from all areas of the state who are interested in white-tailed deer. People have many different ways of relating to this species. Studies of deer hunters have shown that there are some who want an easy hunt while others prefer difficult and challenging terrain. Some hunters are disturbed if they see a footprint of another hunter while others enjoy the atmosphere of extremely high hunter densities. Similarly, non-hunters have diverse and varied ways of appreciating deer. Some people park their cars on forest roads and wait for deer at dusk. Others search for deer on foot. Still others do not intentionally search for wildlife but value incidental deer sightings as moments of enchantment and vivid memory. Other people do not search for deer but spend time reading and learning about deer and are deeply concerned with the welfare of the herd.

Some categories of public demand, interest and behavior in relation to deer have been identified in this study. The sizes of various groups and characteristics of people in these groups have been discussed. Possible

management strategies have also been discussed to accommodate some of these public demands.

The role of wildlife management is rapidly expanding beyond that of wildlife production, habitat manipulation and harvest regulation. The behavior of deer can probably be managed to increase the rate at which the public has an opportunity to see deer. Public behavior can also be managed, not only through regulation, but by increasing public knowledge and affecting attitudes. In the final analysis, this implies that managers do more than measure public demand and then make a response. Specific public demands can be predicted, created, channeled or discouraged.

There is an inherent dilemma in this approach which has been recognized but rarely addressed. In the United States, wildlife resources are held in trust for the public by the states. Wildlife management is assumed by governmental agencies. The consequent dilemma is that government must respond to people's desires while also protecting the resources for this and future generations. Within this context, it is somehow disturbing to read that Supreme Court Justice Oliver Wendell Holmes once said that, "It is the duty of government to be responsive to the will of the people, right or wrong" (Rintamaki 1975). Contrary to Justice Holmes's comment, many natural resource managers recognize a "will of the people" which

is not always obvious. That voice is from unborn generations who will inherit the benefits or failures of wildlife management today. It is the professional responsibility of the wildlife manager, when necessary, to advise people what they should want, to educate the public, and occasionally to remind them that the resource will not always allow them to have what they want. A long-range solution to this dilemma is also apparent if education is viewed as one function of the practicing wildlife biologist. Many demands of the public are made without adequate facts or knowledge. If government ensures that public desires are made with facts at hand, perhaps the will of the people would more often be perceived as "right" by regulating agencies.

This study has addressed itself to non-hunting uses of wildlife without reviewing some salient management concerns. Some current thinking suggests that hunters have shouldered the burden of wildlife management for too long and that non-hunters should contribute financially to such programs. Others advocate that there is an inherent danger in soliciting the financial support of non-hunters because they would then have "voting power" and could potentially threaten the future of hunting throughout the country. Results of this study seem to reinforce the latter view. In Michigan, there are nearly as many anti-hunters involved in observing (Type IV) deer

as there are hunters. As previously discussed, wildlife managers have tended to reinforce the polarity of these groups by not stimulating constructive interaction between these groups. A possible solution may be to solicit the financial support of the non-hunter first in the management of non-game species and later for game species.

A specific management framework for optimizing public benefits from a stable deer population was presented. In much of the thinking of wildlife people today there is the recurrent theme that higher and higher densities of wildlife are needed. Future management strategies will hopefully be concerned with maintaining stable populations rather than with increasing numbers.

Many of the current issues and problems in wildlife management seem to have developed because the technology of the field has progressed faster than philosophical and humanistic aspects. Although the technology exists to put 5, 15, or 80 deer on a section of forested land, the reasons for selecting a certain numerical goal are undefined. There has been a rapid movement in the philosophy of game management but some current problems reflect the need for a newer philosophy. At one time, game was managed because it was a food crop and the lack of harvest was viewed as waste. Since then, there has been an evolution of goals from "hunter bag success" to "hunter satisfaction" to "public satisfaction" and finally

to "public benefit." Many biologists still feel uncomfortable with the concept that wildlife is only significant in terms of the philosophical, esthetic, educational or recreational benefits to man. There are concerns that wildlife should be managed for intrinsic values which may or may not have anything to do with benefits to humans. Similarly, some of the public, especially the younger people, are displaying "anti-management" attitudes which may be much more difficult to deal with than anti-hunting attitudes. Much of this is related to preservationism but some may reflect the need for a philosophy of game management which extends beyond direct human benefit. In the meantime, we would be well advised at least to catch up with the philosophy we do have and begin managing wildlife for the benefit of all people.

In many ways we have even failed to properly serve the hunter. The focus has been on the few moments during the hunt when the resource is harvested. The majority of hunting time is non-consumptive and has component experiences and benefits which may be affected by habitat improvement techniques, hunting regulations and education. The experiences of a hunter during these non-consumptive moments might include appreciation of nature, satisfying social exchange and search. In some cases, the elements of search and appreciation may be the same as those for the non-consumptive user. Until the trigger

is pulled, or the shutter opened, the behavior of the hunter and photographer may well be parallel. Major differences appear to be in what occurs after the animal is sighted. Managing wildlife for a total hunting experience may not be much different than managing wildlife for non-consumptive benefits.

A final concern is that there have been some factions who have used non-consumptive benefit arguments to justify plans and programs which are not always in the best interest of hunting. There is a serious danger that this appeal to management for non-consumptive use and management of non-game species will cause the profession to underestimate the need for managing the quality of hunting. The most urgent need is for a philosophy of wildlife management, with a wider scope than human entertainment and benefit, to properly assign priorities for both consumptive and non-consumptive human experiences.

LITERATURE CITED

LITERATURE CITED

Aney, W. W., and C. D. Cowan. 1974. Oregon wildlife preferences and activity survey. Oregon Wildlife Commission. Corvallis, Oregon.

_____ and C. D. Cowan. 1975. Survey shows wildlife important recreational resource. Oregon Wildl. 30(2):8-9.

Applegate, J. E. 1974. Attitudes and characteristics of users of the Assunpink Fish and Wildlife Management Area. P-R Proj. Rep. W-52-R-2. Job IX-B. 17 pp.

Babbie, E. R. 1973. Survey research methods. Wadsworth Publishing Co., Belmont, Calif. 383 pp.

Behrend, D. F., and R. A. Lubeck. 1968. Summer flight behavior of white-tailed deer in the Adirondack forests. J. Wildl. Manage. 32(3):615-618.

Belyea, G. Y., and J. M. Lerg. 1976. Public use of southern Michigan game and recreation areas. Michigan Dept. Nat. Resour. Wildl. Div. Rep. No. 2754. 96 pp.

Bennett, C. L., Jr. 1974. Deer range research--what it's all about. Michigan Dept. of Nat. Resour. Info. Circ. No. 172. 4 pp.

Byelich, J., J. Cook, and R. I. Blouch. 1972. Management for deer. Pages 120-125 in North Central Forest Experiment Station, ed. Aspen Symposium Proceedings. U.S.D.A. Forest Service Report NC-1.

_____. 1973. Basic resource data for deer range management. Michigan Dept. of Nat. Resour. Wildl. Div. Rep. No. 2708. 54 pp.

Colorado Division of Wildlife. 1974. The strategy of today, for wildlife tomorrow: A strategic plan for the comprehensive management of Colorado's wildlife resource. Vol. 1. Colorado Dept. Nat. Resour. Div. of Wildlife. 103 pp.

Cook, J. L. 1975. Forage production and utilization. Michigan Dept. of Nat. Resour. P-R Proj. Rep. W-117-R. Job 6.5. 4 pp.

Duvendeck, J. P. 1975. Doe condition and fawn survival. Michigan Dept. of Nat. Resour. P-R Proj. Rep. W-117-R. Study 10. 6 pp.

Hawn, L. J. 1975. The 1974 deer season. Michigan Dept. of Nat. Resour. Surv. and Stat. Serv. Rep. No. 146. 9 pp.

Heezen, K. L. 1975. Relationship among game area uses. Michigan Dept. of Nat. Resour. P-R Proj. Rep. W-118-R. Study 2. 6 pp.

Hendee, J. C. 1969. Appreciative versus consumptive uses of wildlife refuges: Studies of who gets what and trends in use. Trans. N. Am. Wildl. Nat. Resour. Conf. 34:252-264.

Horvath, J. C. 1974. Southeastern executive summary. Economic survey of wildlife recreation. Environmental Research Group. Georgia State University, Atlanta. 68 pp.

Klessig, L. L., and J. B. Hale. 1972. A profile of Wisconsin hunters. Wisconsin Dept. of Nat. Resour. Bull. 60. 24 pp.

Langenau, E. E., Jr., R. M. Levine, G. C. Jamsen, and P. M. Lange. 1975a. Attitudes of forest recreationists, other than firearm deer hunters, using experimental clearcuttings. Michigan Dept. of Nat. Resour. Wildl. Div. Rep. No. 2748. 15 pp.

_____. 1975. Opinions and attitudes. Dept. of Nat. Resour. P-R Proj. Rep. W-117-R. Study 9. 4 pp.

Michigan Bureau of Management and Budget. 1974. Michigan 1973-1974 Zip Code Directory. Lansing, Michigan.

Moncrief, L. W. 1970. An analysis of hunter attitude toward the State of Michigan's antlerless deer hunting policy. Ph.D. Thesis. Michigan State University, East Lansing. 258 pp.

Moran, R. J. 1975. Monitoring of deer populations. Michigan Dept. of Nat. Resour. P-R Proj. Rep. W-117-R. Job 6.4. 15 pp.

Ozoga, J. J. 1975. Field trial of maintaining deer under artificial conditions. Michigan Dept. of Nat. Resour. P-R Proj. Rep. W-117-R. Study 7. 19 pp.

Petoskey, M. L. 1971. 1,000,000 by 1980. Michigan Nat. Resour. 40(6):1-7.

Rintamaki, G. 1975. Outdoor observations. Newberry News. 1 p.

Stankey, G. H. 1973. Visitor perception of wilderness recreation carrying capacity. U.S.D.A. For. Serv. Res. Pap. No. INT-142. 61 pp.

Verme, L. J. 1975. Cooperative studies on penned deer. Michigan Dept. of Nat. Resour. P-R Proj. Rep. W-117-R. Study 2. 3 pp.

APPENDICES

APPENDIX I

INITIAL QUESTIONNAIRE

(see pocket inside the back cover)

APPENDIX II

FIRST REMINDER

(see pocket inside the back cover)

APPENDIX III

SECOND REMINDER

(see pocket inside the back cover)

APPENDIX IV

QUESTIONNAIRE RESPONSES OF HUNTERS, NON-HUNTERS AND ANTI-HUNTERS IN REGION I

APPENDIX IV

QUESTIONNAIRE RESPONSES OF HUNTERS, NON-HUNTERS AND ANTI-HUNTERS IN REGION I

Item	Hunters N=268	Non-Hunters N=371	Anti-Hunters N=163
Deer seen in past year			
Never saw a wild deer	1%	1%	6%
0 deer	3%	11%	18%
1-10 deer	36%	55%	54%
11-50 deer	32%	22%	17%
More than 50 deer	28%	11%	5%
Deer are abundant in Michigan			
Strongly agree	7%	6%	4%
Agree	30%	39%	36%
Disagree	49%	46%	45%
Strongly disagree	14%	9%	15%
We should have more deer in Michigan			
Strongly agree	46%	30%	33%
Agree	44%	53%	48%
Disagree	8%	15%	15%
Strongly disagree	2%	2%	4%
Deer signs seen in Michigan			
Deer tracks	99%	89%	79%
Deer trails	96%	79%	69%
Deer beds	93%	52%	34%
Deer yards	75%	54%	39%
Deer droppings	97%	72%	56%

Item	Hunters N=268	Non-Hunters N=371	Anti-Hunters N=163
Have Hunted	100%	45%	22%
Selected Recreations			
Fishing	90%	61%	43%
Hiking	59%	56%	64%
Camping	69%	50%	47%
Snowmobiling	45%	24%	23%
Birdwatching	29%	39%	54%
Skiing	22%	20%	29%
Trailbike Riding	23%	10%	14%
How much seeing deer adds or detracts from favorite recreation			
Adds a lot	89%	79%	83%
Adds a little	9%	14%	7%
Neither adds or detracts	2%	5%	10%
Detracts a little	0%	2%	0%
Detracts a lot	0%	0%	0%
Sex of Respondent			
Male	87%	42%	34%
Female	13%	58%	66%
Education			
Grade school	7%	7%	3%
High school	40%	43%	31%
Some college	27%	21%	28%
College	14%	16%	14%
Graduate/Professional Degree	12%	13%	24%
Marital Status			
Single	14%	10%	14%
Married	80%	81%	71%
Divorced	5%	3%	5%
Widowed	1%	6%	10%
Mean Age	40.6	44.2	41.5

Item	Hunters N=268	Non-Hunters N=371	Anti-Hunters N=163
Current Residence			
Major City	1%	0%	0%
Medium City	1%	0%	4%
Suburb	1%	2%	1%
Small City	11%	13%	18%
Town	61%	59%	59%
Rural	25%	26%	18%
Childhood Residence			
Major City	13%	8%	22%
Medium City	7%	8%	12%
Suburb	5%	4%	11%
Small City	14%	17%	14%
Town	36%	39%	28%
Rural	25%	21%	13%
Multiple	0%	3%	0%
Occupation			
Homemaker	5.3%	31.8%	29.4%
Technical/Professional	17.1%	12.8%	13.1%
Unskilled Labor	18.7%	6.4%	5.6%
Managerial	10.7%	9.5%	7.5%
Skilled Labor	13.7%	5.3%	4.4%
Secretarial/Clerical	4.6%	9.5%	9.4%
Educational	6.1%	7.8%	14.4%
Retired	10.7%	10.6%	6.9%
All Others	13.0%	6.1%	9.3%

APPENDIX V

QUESTIONNAIRE RESPONSES OF HUNTERS, NON-HUNTERS AND ANTI-HUNTERS IN REGION II

APPENDIX V

QUESTIONNAIRE RESPONSES OF HUNTERS, NON-HUNTERS AND ANTI-HUNTERS IN REGION II

Item	Hunters N=218	Non-Hunters N=435	Anti-Hunters N=195
Deer seen in past year			
Never saw a wild deer	0%	2%	5%
0 deer	1%	14%	23%
1-10 deer	26%	45%	43%
11-50 deer	26%	22%	23%
More than 50 deer	48%	17%	6%
Deer are abundant in Michigan			
Strongly agree	13%	8%	5%
Agree	42%	60%	51%
Disagree	32%	27%	36%
Strongly disagree	13%	5%	8%
We should have more deer in Michigan			
Strongly agree	39%	18%	20%
Agree	44%	56%	54%
Disagree	15%	24%	23%
Strongly disagree	2%	2%	3%
Deer signs seen in Michigan			
Deer tracks	99%	89%	79%
Deer trails	99%	81%	65%
Deer beds	94%	52%	37%
Deer yards	74%	37%	29%
Deer droppings	96%	69%	59%

Item	Hunters N=218	Non-Hunters N=435	Anti-Hunters N=195
Have Hunted	100%	48%	20%
Selected Recreations			
Fishing	93%	57%	35%
Hiking	62%	51%	57%
Camping	59%	45%	45%
Snowmobiling	41%	18%	11%
Birdwatching	36%	43%	48%
Skiing	15%	21%	24%
Trailbike Riding	21%	8%	5%
How much seeing deer adds or detracts from favorite recreation			
Adds a lot	87%	76%	78%
Adds a little	6%	13%	12%
Neither adds or detracts	7%	11%	10%
Detracts a little	0%	0%	0%
Detracts a lot	0%	0%	0%
Sex of Respondent			
Male	90%	43%	35%
Female	10%	57%	65%
Education			
Grade school	8%	7%	5%
High school	39%	34%	24%
Some college	29%	22%	29%
College	11%	20%	25%
Graduate/Professional Degree	13%	17%	17%
Marital Status			
Single	11%	9%	14%
Married	81%	81%	75%
Divorced	6%	5%	5%
Widowed	2%	5%	6%
Mean Age	42.83	44.92	43.36

Item	Hunters N=218	Non-Hunters N=435	Anti-Hunters N=195
Current Residence			
Major City	0%	1%	0%
Medium City	0%	1%	4%
Suburb	20%	3%	3%
Small City	41%	26%	34%
Town	38%	44%	36%
Rural	1%	25%	23%
Childhood Residence			
Major City	16%	17%	18%
Medium City	7%	10%	16%
Suburb	7%	6%	10%
Small City	15%	15%	22%
Town	30%	31%	21%
Rural	23%	21%	13%
Multiple	1%	0%	0%
Occupation			
Homemaker	6.1%	25.2%	28.5%
Technical/Professional	13.0%	16.1%	12.5%
Unskilled Labor	21.0%	5.6%	3.6%
Managerial	9.8%	11.9%	11.4%
Skilled Labor	12.6%	6.1%	4.1%
Secretarial/Clerical	1.9%	7.5%	9.3%
Educational	3.3%	10.7%	9.8%
Retired	13.1%	9.8%	7.8%
All Others	20.1%	7.1%	12.9%

APPENDIX VI

QUESTIONNAIRE RESPONSES OF HUNTERS, NON-HUNTERS AND ANTI-HUNTERS IN REGION III

APPENDIX VI

QUESTIONNAIRE RESPONSES OF HUNTERS, NON-HUNTERS AND ANTI-HUNTERS IN REGION III

Item	Hunters N=106	Non-Hunters N=435	Anti-Hunters N=195
Deer seen in past year			
Never saw a wild deer	4%	16%	22%
0 deer	9%	36%	33%
1-10 deer	48%	40%	36%
11-50 deer	24%	5%	6%
More than 50 deer	15%	3%	3%
Deer are abundant in Michigan			
Strongly agree	8%	7%	6%
Agree	52%	50%	47%
Disagree	35%	38%	38%
Strongly disagree	5%	5%	9%
We should have more deer in Michigan			
Strongly agree	34%	17%	19%
Agree	55%	57%	56%
Disagree	11%	24%	21%
Strongly disagree	0%	2%	4%
Deer signs seen in Michigan			
Deer tracks	96%	67%	53%
Deer trails	95%	53%	44%
Deer beds	88%	33%	17%
Deer yards	58%	24%	15%
Deer droppings	88%	49%	33%

Item	Hunters N=106	Non-Hunters N=435	Anti-Hunters N=195
Have Hunted	100%	49%	23%
Selected Recreations			
Fishing	88%	51%	42%
Hiking	55%	47%	49%
Camping	71%	45%	43%
Snowmobiling	28%	12%	12%
Birdwatching	20%	32%	38%
Skiing	15%	13%	18%
Trailbike riding	18%	12%	10%
How much seeing deer adds or detracts from favorite recreation			
Adds a lot	83%	72%	71%
Adds a little	12%	18%	18%
Neither adds or detracts	4%	9%	11%
Detracts a little	1%	1%	0%
Detracts a lot	0%	0%	0%
Sex of Respondent			
Male	91%	54%	39%
Female	9%	46%	61%
Education			
Grade school	12%	8%	5%
High school	45%	31%	29%
Some college	25%	28%	28%
College	10%	19%	14%
Graduate/Professional Degree	8%	14%	24%
Marital Status			
Single	13%	12%	19%
Married	77%	75%	72%
Divorced	8%	7%	5%
Widowed	2%	6%	4%
Mean Age	40.57	43.35	42.07

Item	Hunters N=106	Non-Hunters N=435	Anti-Hunters N=195
Current Residence			
Major City	9%	20%	20%
Medium City	14%	10%	13%
Suburb	15%	26%	28%
Small City	24%	18%	16%
Town	20%	14%	12%
Rural	18%	12%	11%
Childhood Residence			
Major City	6%	9%	15%
Medium City	8%	7%	9%
Suburb	6%	7%	11%
Small City	18%	18%	19%
Town	32%	33%	31%
Rural	30%	25%	15%
Multiple	0%	0%	0%
Occupation			
Homemaker	4.9%	16.8%	25.9%
Technical/Professional	11.7%	17.7%	17.0%
Unskilled Labor	27.2%	14.3%	7.5%
Managerial	15.5%	12.1%	7.5%
Skilled Labor	22.3%	7.2%	5.2%
Secretarial/Clerical	1.9%	8.7%	12.3%
Educational	1.0%	7.2%	10.8%
Retired	3.9%	5.6%	4.7%
All Others	11.7%	10.3%	8.5%

APPENDIX VII

QUESTIONNAIRE RESPONSES OF HUNTERS, NON-HUNTERS AND ANTI-HUNTERS (WEIGHTED MEANS FOR MICHIGAN)

APPENDIX VII

QUESTIONNAIRE RESPONSES OF HUNTERS, NON-HUNTERS AND ANTI-HUNTERS (WEIGHTED MEANS FOR MICHIGAN)

Item	Hunters	Non-Hunters	Anti-Hunters
Deer seen in past year			
Never saw a wild deer	3%	14%	20%
0 deer	8%	34%	32%
1-10 deer	47%	42%	37%
11-50 deer	25%	7%	8%
More than 50 deer	17%	3%	3%
Deer are abundant in Michigan			
Strongly agree	8%	7%	5%
Agree	50%	51%	47%
Disagree	36%	38%	38%
Strongly disagree	6%	4%	10%
We should have more deer in Michigan			
Strongly agree	35%	17%	20%
Agree	56%	57%	55%
Disagree	9%	24%	21%
Strongly disagree	0%	2%	4%
Deer signs seen in Michigan			
Deer tracks	97%	70%	56%
Deer trails	96%	56%	47%
Deer beds	89%	35%	19%
Deer yards	60%	26%	17%
Deer droppings	89%	52%	36%

Item	Hunters	Non-Hunters	Anti-Hunters
Have Hunted	100%	49%	23%
Selected Recreations			
Fishing	88%	52%	42%
Hiking	55%	47%	51%
Camping	70%	46%	44%
Snowmobiling	30%	13%	13%
Birdwatching	22%	32%	39%
Skiing	18%	14%	19%
Trailbike riding	19%	12%	10%
How much seeing deer adds or detracts from favorite recreation			
Adds a lot	85%	72%	72%
Adds a little	11%	18%	17%
Neither adds or detracts	3%	9%	11%
Detracts a little	1%	1%	0%
Detracts a lot	0%	0%	0%
Sex of Respondent			
Male	91%	53%	38%
Female	9%	47%	62%
Education			
Grade school	11%	7%	4%
High school	45%	31%	30%
Some college	25%	28%	28%
College degree	11%	20%	15%
Graduate degree	8%	14%	23%
Marital Status			
Single	13%	12%	19%
Married	78%	76%	73%
Divorced	7%	7%	4%
Widowed	2%	5%	4%
Mean Age	42.39	44.10	42.15

Item	Hunters	Non-Hunters	Anti-Hunters
Current Residence			
Major City	8%	18%	18%
Medium City	12%	9%	11%
Suburb	15%	23%	24%
Small City	25%	18%	18%
Town	23%	18%	16%
Rural	17%	14%	13%
Childhood Residence			
Major City	7%	8%	15%
Medium City	8%	6%	8%
Suburb	6%	6%	11%
Small City	18%	19%	20%
Town	32%	35%	31%
Rural	29%	26%	15%
Multiple	0%	0%	0%
Occupation			
Homemaker	5.0%	18.1%	26.5%
Technical/Professional	12.0%	17.4%	16.6%
Unskilled Labor	26.4%	13.3%	7.1%
Managerial	14.8%	12.0%	7.8%
Skilled Labor	21.2%	7.0%	5.1%
Secretarial/Clerical	2.0%	8.7%	12.0%
Educational	1.4%	7.5%	10.9%
Retired	4.8%	6.2%	5.1%
All Others	12.4%	9.8%	8.9%

APPENDIX I

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF FISHERIES AND WILDLIFE
NATURAL RESOURCES BUILDING

EAST LANSING · MICHIGAN · 48824

Dear Michigan Resident:

Several controversies have arisen during the past few years about the management of Michigan's deer herd; how it should be managed by the state and for which people it should be managed.

In order to better understand this situation, Michigan State University is studying the attitudes of people towards deer. We feel that information from a survey of public opinion will help deer managers do a better job for all the people, hunters and non-hunters alike. The results of this research will be made available to officials of the Department of Natural Resources, to professional biologists, and to students being trained here at the University.

It is especially important that we know how you, as an individual, feel about deer. Only a few people in your area have been chosen to participate in this research as this is a state-wide survey. To have the best information, we need to hear from everyone who receives this letter, even if you are not interested in deer. It is important, too, that this form should be completed by the person to whom it is addressed. Otherwise we will hear only from"outdoors-minded" people and we will be able to say very little about attitudes of Michigan people in general.

Please help by completing the questionnaire and mailing it back in the stamped envelope. The Department of Natural Resources has agreed to help with the mailing. Hence, the DNR address is on the return envelope.

None of your tax money is being used for the survey. This study has been funded by grant monies from private non-profit research organizations.

Thank you for your kind cooperation. Please let us hear from you soon.

Sincerely,

George A Petrides

George A. Petrides
Professor

GAP:mvr

DEER ATTITUDE SURVEY

PLEASE CHECK THE SPACE NEXT TO THE STATEMENT WHICH BEST DESCRIBES HOW YOU FEEL ABOUT THE QUESTION

1. We are interested in learning how much you appreciate the Michigan deer herd. In general, how would you rate the pleasure you get, or would get from seeing deer in the wild?
   ☐ Very high ☐ High ☐ Medium ☐ Low ☐ Very low

2. If you were going to take a trip just to look for wild deer, how many miles would you be willing to drive (round trip)?
   ☐ 0 ☐ 1-10 ☐ 11-50 ☐ 51-200 ☐ More than 200

3. Please estimate the number of wild deer you have seen in Michigan during the past 12 months.
   ☐ I have never seen a wild deer.
   ☐ 1-10 in the past 12 months.
   ☐ More than 50 in the past 12 months.
   ☐ I have seen wild deer, but none in the past 12 months.
   ☐ 11-50 in the past 12 months.

4. Deer are often seen in groups. Which would you prefer to see? (Please check only one.)
   ☐ 1 deer ☐ 1 group of 10 deer ☐ 1 group of 100 deer ☐ No preference

5. Which would you prefer to see? (Please check only one.)
   ☐ Buck ☐ Doe ☐ Fawn ☐ No preference

6. Which would you prefer to see? (Please check only one.)
   ☐ A group of 3 bucks ☐ A group of 1 doe and her 2 fawns ☐ No preference

7. Which season do you most prefer to see deer? (Please check only one.)
   ☐ Winter ☐ Spring ☐ Summer ☐ Autumn ☐ No preference

8. Where do you prefer to see deer? (Please check only one.)
   ☐ Field ☐ Forest ☐ Lake Shore ☐ Highway ☐ No preference

9. Please list 3 single words which best describe your feelings about each of the following.

   FAWNS _____ DOES _____ BUCKS _____

10. Please check the space which best describes how you feel about each of the following statements.

	Strongly Agree	Agree	Disagree	Strongly Disagree
Taking the state as a whole, deer are abundant in Michigan.				
We should have more deer in Michigan.				
There are too many other problems, such as inflation, to worry about deer.				
I approve of hunting.				
I approve of deer hunting.				

11. Some people would rather see one type of wild animal than another. How would you rate your pleasure in seeing each of the following, compared to your pleasure in seeing deer?

	MUCH MORE THAN DEER	MORE THAN DEER	THE SAME AS DEER	LESS THAN DEER	MUCH LESS THAN DEER
Coyote					
Moose					
Bear					
Eagle					
Bobcat					
Blue Jay					
Elk					

12. Please check yes or no for each of the following. Which of the following have you seen in Michigan?

	Yes	No
Tracks of a wild deer		
Deer trail		
Deer bed		
Deeryard		
Deer droppings		

13. Have deer ever caused significant damage to your property (crops, ornamental shrubs, automobile, etc.)?

☐ Yes, what kind of damage _____ How much damage $_____
☐ No

14. Please estimate the number of times you were doing each of the following activities during the past 12 months. (Please use a zero (0) for activities you did not participate in.)

ACTIVITY	NO. OF TIMES IN PAST 12 MONTHS	AVERAGE NO. HOURS SPENT EACH TIME
Following tracks of a wild deer.		
Driving to look for deer.		
Hiking to look for deer.		
Trying to and/or photographing wild deer.		
Doing scientific research on deer.		
Reading books specifically about deer.		
Reading magazine articles specifically about deer.		
Reading newspaper articles specifically about deer.		
Reading DNR publications specifically about deer.		
Attending school or university lectures about deer.		
Attending community meetings specifically about deer.		
Talking to friends specifically about deer.		
Watching T.V. programs specifically about deer.		

15. Please check yes or no for each of the following.

	Yes	No
Have you ever hunted?		
Did you hunt in Michigan during the past 12 months?		
Have you ever hunted deer?		
Did you hunt deer in Michigan during the past 12 months?		

16. Which of the following forms of outdoor recreation do you participate in?

Scenic driving	_____	X-country or downhill skiing	_____
Fishing	_____	Nature photography	_____
Hiking	_____	Trailbike riding	_____
Camping	_____	Mushroom hunting	_____
Snowmobiling	_____	Boating or canoeing	_____
Deer hunting	_____	Swimming	_____
Other hunting	_____	Other (Please specify)	_____
Birdwatching	_____	Other (Please specify)	_____

17. About how many days did you spend in outdoor recreation in Michigan during the past 12 months?

days _____

18. Which *one* of the above activities have you spent most time doing in Michigan during the past 12 months?

_____

	ADDS A LOT	ADDS A LITTLE	NEITHER ADDS NOR DETRACTS	DETRACTS A LITTLE	DETRACTS A LOT
How much does seeing deer add to or detract from your enjoyment of this activity?					
How much does seeing wildlife, other than deer, add or detract from your enjoyment of this activity?					
How much does seeing deer signs (tracks, etc.) add or detract from your enjoyment of this activity?					
How much does just knowing deer are in the area add or detract from your enjoyment of the activity?					

THE FOLLOWING QUESTIONS ARE CONFIDENTIAL AND WILL NOT BE LINKED WITH YOUR NAME

19. What is your age? _____

20. What is your sex? Male _____ Female _____

21. Please check the highest level of education you have completed.

Grade school	☐	College degree	☐
High School	☐	Graduate or professional degree	☐
Some College	☐		

22. What is your principal occupation? _____

23. Marital status:

☐ Single ☐ Married ☐ Divorced ☐ Widowed

24. Do you have any children, under 21 years of age, living at home with you?

☐ Yes ☐ No

25. Please check the one category below which best describes the type of area where you live.

A major city (more than 500,000)	☐
Medium city (100,000 - 500,000)	☐
Suburb of medium or large city	☐
Small city (25,000 - 100,000)	☐
Small town or village	☐
Rural setting (farm, etc.)	☐

26. Please check the one category below which best describes the type of area where you lived when growing up.

A major city (more than 500,000)	☐
Medium city (100,000 - 500,000)	☐
Suburb of medium or large city	☐
Small city (25,000 - 100,000)	☐
Small town or village	☐
Rural setting (farm, etc.)	☐

THANK YOU FOR YOUR COOPERATION AND HELP IN THIS SURVEY

APPENDIX II

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF FISHERIES AND WILDLIFE
NATURAL RESOURCES BUILDING

EAST LANSING • MICHIGAN • 48824

Dear Michigan Resident:

About a month ago we sent you a questionnaire which concerned deer. We did not receive a reply from you. Another copy is enclosed. Even if you rarely see or think about deer, it is important that we hear from you.

From previous experience, we know people who returned questionnaires feel differently than those who did not. You are an individual who was carefully chosen and we need your answers on the enclosed form. This will enable us to know the true range of opinions held by people throughout the state.

We realize that this survey does require time and effort on your part. We would be grateful, however if you would help us by completing the questionnaire and mailing it back in the stamped envelope.

Thank you for your help in this survey.

Sincerely,

George A. Petrides

George A. Petrides
Professor

GAP:mvr

P.S. If you have recently mailed your first form, please disregard this reminder.

DEER ATTITUDE SURVEY

PLEASE CHECK THE SPACE NEXT TO THE STATEMENT WHICH BEST DESCRIBES HOW YOU FEEL ABOUT THE QUESTION

1. We are interested in learning how much you appreciate the Michigan deer herd. In general, how would you rate the pleasure you get, or would get from seeing deer in the wild?
   ☐ Very high ☐ High ☐ Medium ☐ Low ☐ Very low

2. If you were going to take a trip just to look for wild deer, how many miles would you be willing to drive (round trip)?
   ☐ 0 ☐ 1-10 ☐ 11-50 ☐ 51-200 ☐ More than 200

3. Please estimate the number of wild deer you have seen in Michigan during the past 12 months.
   ☐ I have never seen a wild deer.
   ☐ 1-10 in the past 12 months.
   ☐ More than 50 in the past 12 months.
   ☐ I have seen wild deer, but none in the past 12 months.
   ☐ 11-50 in the past 12 months.

4. Deer are often seen in groups. Which would you prefer to see? (Please check only one.)
   ☐ 1 deer ☐ 1 group of 10 deer ☐ 1 group of 100 deer ☐ No preference

5. Which would you prefer to see? (Please check only one.)
   ☐ Buck ☐ Doe ☐ Fawn ☐ No preference

6. Which would you prefer to see? (Please check only one.)
   ☐ A group of 3 bucks ☐ A group of 1 doe and her 2 fawns ☐ No preference

7. Which season do you most prefer to see deer? (Please check only one.)
   ☐ Winter ☐ Spring ☐ Summer ☐ Autumn ☐ No preference

8. Where do you prefer to see deer? (Please check only one.)
   ☐ Field ☐ Forest ☐ Lake Shore ☐ Highway ☐ No preference

9. Please list 3 single words which best describe your feelings about each of the following.

FAWNS	DOES	BUCKS
_____	_____	_____

10. Please check the space which best describes how you feel about each of the following statements.

	Strongly Agree	Agree	Disagree	Strongly Disagree
Taking the state as a whole, deer are abundant in Michigan.				
We should have more deer in Michigan.				
There are too many other problems, such as inflation, to worry about deer.				
I approve of hunting.				
I approve of deer hunting.				

11. Some people would rather see one type of wild animal than another. How would you rate your pleasure in seeing each of the following, compared to your pleasure in seeing deer?

	MUCH MORE THAN DEER	MORE THAN DEER	THE SAME AS DEER	LESS THAN DEER	MUCH LESS THAN DEER
Coyote					
Moose					
Bear					
Eagle					
Bobcat					
Blue Jay					
Elk					

12. Please check yes or no for each of the following. Which of the following have you seen in Michigan?

	Yes	No
Tracks of a wild deer		
Deer trail		
Deer bed		
Deeryard		
Deer droppings		

13. Have deer ever caused significant damage to your property (crops, ornamental shrubs, automobile, etc.)?

☐ Yes, what kind of damage _____ How much damage $_____
☐ No

14. Please estimate the number of times you were doing each of the following activities during the past 12 months. (Please use a zero (0) for activities you did not participate in.)

ACTIVITY	NO. OF TIMES IN PAST 12 MONTHS	AVERAGE NO. HOURS SPENT EACH TIME
Following tracks of a wild deer.		
Driving to look for deer.		
Hiking to look for deer.		
Trying to and/or photographing wild deer.		
Doing scientific research on deer.		
Reading books specifically about deer.		
Reading magazine articles specifically about deer.		
Reading newspaper articles specifically about deer.		
Reading DNR publications specifically about deer.		
Attending school or university lectures about deer.		
Attending community meetings specifically about deer.		
Talking to friends specifically about deer.		
Watching T.V. programs specifically about deer.		

15. Please check yes or no for each of the following.

	Yes	No
Have you ever hunted?		
Did you hunt in Michigan during the past 12 months?		
Have you ever hunted deer?		
Did you hunt deer in Michigan during the past 12 months?		

16. Which of the following forms of outdoor recreation do you participate in?

Scenic driving	_____	X-country or downhill skiing	_____
Fishing	_____	Nature photography	_____
Hiking	_____	Trailbike riding	_____
Camping	_____	Mushroom hunting	_____
Snowmobiling	_____	Boating or canoeing	_____
Deer hunting	_____	Swimming	_____
Other hunting	_____	Other (Please specify)	_____
Birdwatching	_____	Other (Please specify)	_____

17. About how many days did you spend in outdoor recreation in Michigan during the past 12 months?

days _____

18. Which *one* of the above activities have you spent most time doing in Michigan during the past 12 months?

_____

	ADDS A LOT	ADDS A LITTLE	NEITHER ADDS NOR DETRACTS	DETRACTS A LITTLE	DETRACTS A LOT
How much does seeing deer add to or detract from your enjoyment of this activity?					
How much does seeing wildlife, other than deer, add or detract from your enjoyment of this activity?					
How much does seeing deer signs (tracks, etc.) add or detract from your enjoyment of this activity?					
How much does just knowing deer are in the area add or detract from your enjoyment of the activity?					

THE FOLLOWING QUESTIONS ARE CONFIDENTIAL AND WILL NOT BE LINKED WITH YOUR NAME

19. What is your age? _____

20. What is your sex? Male _____ Female _____

21. Please check the highest level of education you have completed.

Grade school ☐
High School ☐
Some College ☐
College degree ☐
Graduate or professional degree ☐

22. What is your principal occupation? _____

23. Marital status:

☐ Single ☐ Married ☐ Divorced ☐ Widowed

24. Do you have any children, under 21 years of age, living at home with you?

☐ Yes ☐ No

25. Please check the one category below which best describes the type of area where you live.

A major city (more than 500,000) ☐
Medium city (100,000 - 500,000) ☐
Suburb of medium or large city ☐
Small city (25,000 - 100,000) ☐
Small town or village ☐
Rural setting (farm, etc.) ☐

26. Please check the one category below which best describes the type of area where you lived when growing up.

A major city (more than 500,000) ☐
Medium city (100,000 - 500,000) ☐
Suburb of medium or large city ☐
Small city (25,000 - 100,000) ☐
Small town or village ☐
Rural setting (farm, etc.) ☐

THANK YOU FOR YOUR COOPERATION AND HELP IN THIS SURVEY

APPENDIX III

STATE OF MICHIGAN

WILLIAM G. MILLIKEN, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING, LANSING, MICHIGAN 48926

HOWARD A. TANNER, Director

March 1, 1975

Dear Michigan Resident:

We live in a time when the trust and confidence of people in their elected officials and in government structure are under serious strains. Governments are becoming more and more responsive to the public. To insure responsiveness in their government, the public will need to accept more responsibility in expressing their demands and opinions.

Compared to many other agencies, the DNR has had many controversies and healthy discussions about a number of its policies. Although this sometimes makes the job of natural resource management difficult, we believe it also has caused our DNR to be the most progressive and forward looking agency of its kind in the country. People in Michigan have had a very close attachment to their land and to the many rich natural resources in our state. People were telling us what they thought about natural resources long before the "ecology movement" came to other states.

Professor Petrides of Michigan State University has told me of his research study. We will be very interested in learning about your attitudes towards deer. This University study will help us understand the demands of both hunters and non-hunters for deer and other wildlife management.

I would personally like to encourage you to help in this survey.

Sincerely,

Merrill L. Petoskey

Merrill L. Petoskey, Chief
WILDLIFE DIVISION

MLP:pw
P.S. If you have mailed your previous form, please excuse this reminder.

MICHIGAN
THE GREAT LAKE STATE

R1026 10/74

DEER ATTITUDE SURVEY

PLEASE CHECK THE SPACE NEXT TO THE STATEMENT WHICH BEST DESCRIBES HOW YOU FEEL ABOUT THE QUESTION

1. We are interested in learning how much you appreciate the Michigan deer herd. In general, how would you rate the pleasure you get, or would get from seeing deer in the wild?
   ☐ Very high ☐ High ☐ Medium ☐ Low ☐ Very low

2. If you were going to take a trip just to look for wild deer, how many miles would you be willing to drive (round trip)?
   ☐ 0 ☐ 1-10 ☐ 11-50 ☐ 51-200 ☐ More than 200

3. Please estimate the number of wild deer you have seen in Michigan during the past 12 months.
   ☐ I have never seen a wild deer.
   ☐ 1-10 in the past 12 months.
   ☐ More than 50 in the past 12 months.
   ☐ I have seen wild deer, but none in the past 12 months.
   ☐ 11-50 in the past 12 months.

4. Deer are often seen in groups. Which would you prefer to see? (Please check only one.)
   ☐ 1 deer ☐ 1 group of 10 deer ☐ 1 group of 100 deer ☐ No preference

5. Which would you prefer to see? (Please check only one.)
   ☐ Buck ☐ Doe ☐ Fawn ☐ No preference

6. Which would you prefer to see? (Please check only one.)
   ☐ A group of 3 bucks ☐ A group of 1 doe and her 2 fawns ☐ No preference

7. Which season do you most prefer to see deer? (Please check only one.)
   ☐ Winter ☐ Spring ☐ Summer ☐ Autumn ☐ No preference

8. Where do you prefer to see deer? (Please check only one.)
   ☐ Field ☐ Forest ☐ Lake Shore ☐ Highway ☐ No preference

9. Please list 3 single words which best describe your feelings about each of the following.

FAWNS	DOES	BUCKS
_____	_____	_____

10. Please check the space which best describes how you feel about each of the following statements.

	Strongly Agree	Agree	Disagree	Strongly Disagree
Taking the state as a whole, deer are abundant in Michigan.				
We should have more deer in Michigan.				
There are too many other problems, such as inflation, to worry about deer.				
I approve of hunting.				
I approve of deer hunting.				

11. Some people would rather see one type of wild animal than another. How would you rate your pleasure in seeing each of the following, compared to your pleasure in seeing deer?

	MUCH MORE THAN DEER	MORE THAN DEER	THE SAME AS DEER	LESS THAN DEER	MUCH LESS THAN DEER
Coyote					
Moose					
Bear					
Eagle					
Bobcat					
Blue Jay					
Elk					

12. Please check yes or no for each of the following. Which of the following have you seen in Michigan?

	Yes	No
Tracks of a wild deer		
Deer trail		
Deer bed		
Deeryard		
Deer droppings		

13. Have deer ever caused significant damage to your property (crops, ornamental shrubs, automobile, etc.)?

☐ Yes, what kind of damage _____ How much damage $_____
☐ No

14. Please estimate the number of times you were doing each of the following activities during the past 12 months. (Please use a zero (0) for activities you did not participate in.)

ACTIVITY	NO. OF TIMES IN PAST 12 MONTHS	AVERAGE NO. HOURS SPENT EACH TIME
Following tracks of a wild deer.		
Driving to look for deer.		
Hiking to look for deer.		
Trying to and/or photographing wild deer.		
Doing scientific research on deer.		
Reading books specifically about deer.		
Reading magazine articles specifically about deer.		
Reading newspaper articles specifically about deer.		
Reading DNR publications specifically about deer.		
Attending school or university lectures about deer.		
Attending community meetings specifically about deer.		
Talking to friends specifically about deer.		
Watching T.V. programs specifically about deer.		

15. Please check yes or no for each of the following.

	Yes	No
Have you ever hunted?		
Did you hunt in Michigan during the past 12 months?		
Have you ever hunted deer?		
Did you hunt deer in Michigan during the past 12 months?		

16. Which of the following forms of outdoor recreation do you participate in?

Scenic driving	_____	X-country or downhill skiing	_____
Fishing	_____	Nature photography	_____
Hiking	_____	Trailbike riding	_____
Camping	_____	Mushroom hunting	_____
Snowmobiling	_____	Boating or canoeing	_____
Deer hunting	_____	Swimming	_____
Other hunting	_____	Other (Please specify)	_____
Birdwatching	_____	Other (Please specify)	_____

17. About how many days did you spend in outdoor recreation in Michigan during the past 12 months?

days _____

18. Which *one* of the above activities have you spent most time doing in Michigan during the past 12 months?

_____

	ADDS A LOT	ADDS A LITTLE	NEITHER ADDS NOR DETRACTS	DETRACTS A LITTLE	DETRACTS A LOT
How much does seeing deer add to or detract from your enjoyment of this activity?					
How much does seeing wildlife, other than deer, add or detract from your enjoyment of this activity?					
How much does seeing deer signs (tracks, etc.) add or detract from your enjoyment of this activity?					
How much does just knowing deer are in the area add or detract from your enjoyment of the activity?					

THE FOLLOWING QUESTIONS ARE CONFIDENTIAL AND WILL NOT BE LINKED WITH YOUR NAME

19. What is your age? _____

20. What is your sex? Male _____ Female _____

21. Please check the highest level of education you have completed.

Grade school ☐
High School ☐
Some College ☐
College degree ☐
Graduate or professional degree ☐

22. What is your principal occupation? _____

23. Marital status:

☐ Single ☐ Married ☐ Divorced ☐ Widowed

24. Do you have any children, under 21 years of age, living at home with you?

☐ Yes ☐ No

25. Please check the one category below which best describes the type of area where you live.

A major city (more than 500,000) ☐
Medium city (100,000 - 500,000) ☐
Suburb of medium or large city ☐
Small city (25,000 - 100,000) ☐
Small town or village ☐
Rural setting (farm, etc.) ☐

26. Please check the one category below which best describes the type of area where you lived when growing up.

A major city (more than 500,000) ☐
Medium city (100,000 - 500,000) ☐
Suburb of medium or large city ☐
Small city (25,000 - 100,000) ☐
Small town or village ☐
Rural setting (farm, etc.) ☐

THANK YOU FOR YOUR COOPERATION AND HELP IN THIS SURVEY